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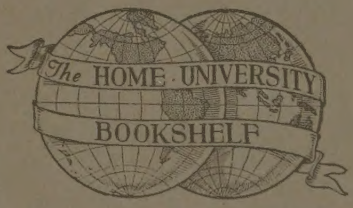
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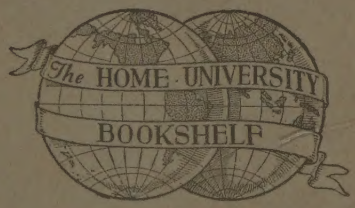

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Barbara Johnson

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NATURE AND OUTDOOR LIFE

VOLUME ONE

WOODCRAFT AND CAMPING

The HOME UNIVERSITY BOOKSHELF

Prepared Under the Supervision of
THE EDITORIAL BOARD
OF
THE UNIVERSITY SOCIETY

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INTRODUCTION

LONG, long ago man lived in the woods. In those days, as now, Nature was either kind and friendly or hard and relentless. To those who knew, she gave life, but to the ignorant or careless she sent death—suddenly through a wild beast, or slowly through starvation.

It was thus man learned how to live—to know where to sleep safely—what animals he could kill by strength and what he must kill by cunning. He learned how to see the signs of their passings, their habits of life, and how to track them. He learned the birds and their habits. Through these things he was acquainted with the goings on about him, as you and I learn them from our daily newspaper.

He came to know what the weather was to be by the clouds, the sunrise, the feel of the air, the moisture on the grass.

Sometimes Nature was smiling, and he got his food and clothes easily. At other times she frowned, and he had to fight bitterly, go hungry, and even starve. Through this adversity he found a way to save the meat for a later day, and discovered what wildwood foods there were to be had in times of famine.

He learned to see, to hear, to act quickly, so that after a while his body came to respond to his mind instantly.

He discovered that he could increase his power by sharp sticks and a stone, and through these eventually developed an ax and a knife. He discovered in some mysterious way how to make fire, the gift of the Great Spirit. Somehow or other, he found iron and discovered how to make tools of it. Then he could cut down the trees, split logs, and do a hundred other things he had never dreamed of before, and do each more easily than in the old way. These things increased his safety and gave him comfort.

With the fire came the grouping of several families around a common center. He learned that several men hunting, working, or fighting together had greater strength and ability than the same number of men singly. Thus he came to see the value of team play.

To him the ways of the woods and how to live in them constituted the science of living. It was woodcraft.

Most of us live to-day in the town or city in a nice house, heated in the winter, screened in the summer, with telephone, trolley, train, school, library, newspapers, and a thousand things that make life easy and pleasant. Our food, our clothes, and all we use are brought to us by a thousand different hands. It is only when we get away from these modern conveniences, as when we go camping, that we get an idea of what it is to be self-reliant and self-sufficient.

What message have these men of early days? Have those men of yesterday who settled America and cleared the land with their own hands anything to teach us to-day?

One thing they surely say to us; that no matter how much we know from books, no matter how many fine and fancy things we can do, we are not really

educated, we cannot really live unless we have eyes that can see; ears that can hear; a hand that can think; a body trained and fortified; a mind wise and quick to act; a knowledge of the things above and about us; and an ability to play the team game.

Woodcraft is lifecraft. To him who learns its meaning comes the joy of living, the ability to achieve, and the desire to serve.

The glory of the sunrise, the message of the pine trees, the sunlight on the rippling mountain lake, the story of the noise in the thicket, the call of the bird, the joy of handicraft, the sense of power in working with others—these are but part of the woodcrafter's and camper's life. To him the trees at a distance shout their names and part of a bird melody tells all of the song.

The knowledge of woodcraft is of untold assistance in camping, and while much can only be learned from actual contact with the great outdoors, a wide variety of other useful and essential knowledge can be gained from the experience of others. And so, in the winter months, the present volume, if wisely used, will tend to smooth the road for the new camper, and blaze still other trails for the old one.

A glance through the Contents will show its wide utility. Here await you a group of the best known men of camp and trail in the whole country—to tell you the secrets of their craft. You need never be a tenderfoot, if you but heed their advice.

Camping and Woodcraft—there is magic in the very sound of the names! Their twin message is that along their pleasant road lies the way to fun and health and happiness.

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THE STORY OF FIRE

THE SPELL OF THE FIRE*

By F. J. PATTEN

Strange are the murmurings in the trees,
Secret the whisperings on the breeze—
Deep in the heart of the wilderness.

Darkness creeps near with its velvet pall,
Silent, relentless, covering all—
Awesome the heart of the wilderness!

Mystery lurks in the trees and sky,
Wild is the sound of the night beast's cry—
Fearsome the heart of the wilderness!

Then—in the darkness, a flash of light
Grows to a camp fire, cherry and bright—
Home in the heart of the wilderness!

*From *Boys' Life*, the Boy Scout magazine.

THE HISTORY OF FIRE-MAKING

By H. L. JEROME

Should you Find Yourself in the Wilderness Without a Match, How Could you Obtain Fire?

THE devices that are in use among uncivilized men for getting fire are interesting. It is a curious fact that the African, in lighting the fire in which to smelt the iron from which he makes his remarkable steel weapons, uses neither stone nor metal in obtaining the first spark. It is interesting to observe the fire-making tools that have been used. They may be divided by the sort of motion required into four classes. Indians, Australians, Eskimos, Hindus, and others use the whirling or drilling motion. Malays, Burmese, and others use a sawing movement. Polynesians, Papuans, and others use a plowing motion, while the custom of obtaining fire by striking a light seems now as common among barbarous as civilized men. In nearly all tribes several methods are used, according to circumstances and the means at hand. A very fine collection of fire-making implements may be seen in the National Museum in the Smithsonian Institution at Washington.* Nearly every method is represented there.

The simplest and probably the oldest and most widely used device is called the two-stick apparatus. It has been used everywhere and at all times. It consists of a rough plank or large stick, which rests on the ground, as a hearth, and a smooth, round stick, from one and a half to two feet long, which we will call the drill. In the gradual improvement of

* The illustrations of fire-making tools for this article were made from the real objects in the Museum of Natural History, New York.

this simple but necessary tool the different tribes show their mental development—their ingenuity or power for thinking.

The wood chosen for the hearth is dry, worm-riddled pieces of juniper or cedar. Drills are also chosen of dry inflammable wood. Many tribes prefer the starchy stem of some flowering plant.

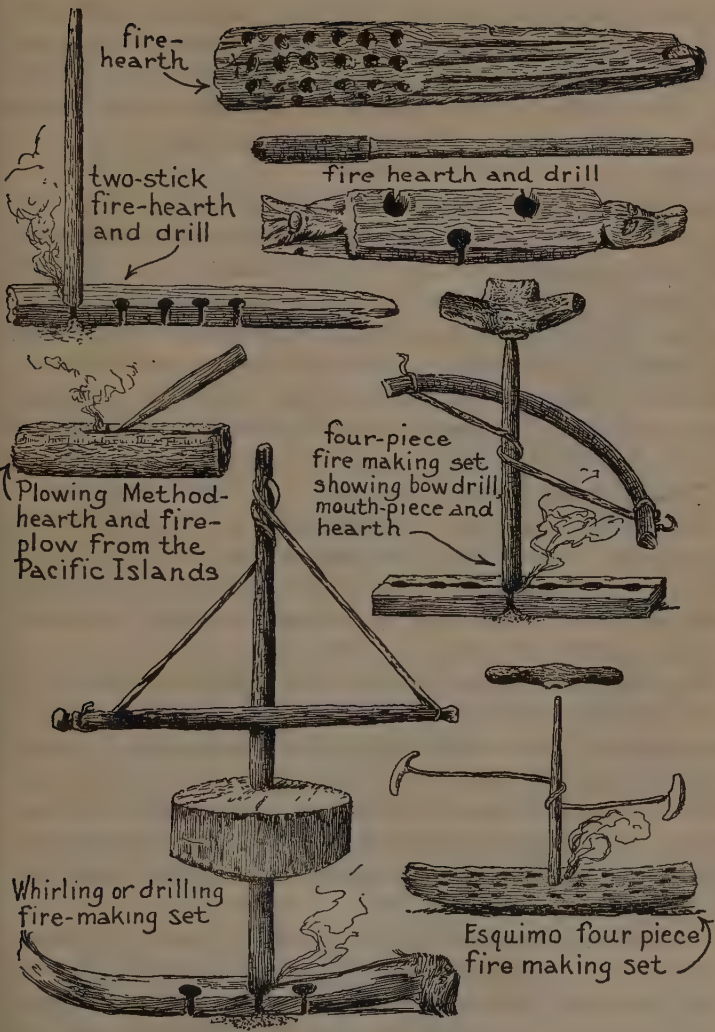
The hearth has one or more—usually many—holes or shallow sockets drilled in its upper face, and narrow slots leading from these sockets or fire-holes to the tinder beneath. The tinder is made of shredded bark, or fungus, which will catch fire quickly and burn slowly, like a slow-match.

An Indian kneels with one knee on each end of the hearth, which is of a convenient length, and placing an end of the fire-stick upright in one of the sockets, or fire-holes, twirls it rapidly between his open palms by rubbing them back and forth past each other almost to the finger-tips. At the same time he presses the drill firmly into the fire-hole, letting his hands move down the drill until they nearly reach the bottom, when they are brought back to the top with a quick, deft motion, and move swiftly down again.

Soon you will see that the wood is being ground off the end of the fire-stick in a fine powder that collects in the narrow slot leading from the fire-hole to the tinder beneath. As the amount of powder increases, it grows darker and darker, until it is almost black. You will notice the odor of burning wood, and after the stick has been twirled from fifteen to forty-five seconds, a little curl of queer-colored smoke will begin to arise. Combustion has begun. The Indian will then tap his wooden hearth, and the smoking pellet will drop out of the slot to the tinder below, where it can easily be blown into a blaze.

It is necessary to keep the fine, friction-heated dust in a close heap if fire is to be generated from wooden tools.

The Quinaielt Indians of the far Northwest used a drill which tapers at each end. This makes the downward pressure more firm, and does not allow the hands to slip down too


fire-
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Plowing Method-
hearth and fire-
plow from the
Pacific Islands
Whirling or drilling
fire-making set
Esquimo four piece
fire making set

rapidly. They used a slow-match of frayed and braided cedar bark, which could be lighted at one end and carried for many days under the blanket if carefully protected from wind and rain. The slots in their hearth are broader, which allows the dust to collect in larger quantities before dropping below.

Some tribes make their fire-making tools more inflammable and more easily ground away into combustible powder by charring the drill in the fire. Sand is often used to increase the friction. This method of making fire was sufficient for its time, for it was seldom necessary to make a new fire, except as a religious ceremony. The art of fire preservation was at its height. Mr. James Mooney reports that "the Cherokees kept fire buried in the mounds upon which the council-houses were built, so that if the house was destroyed by enemies fire would remain for a year or so."

Some tribes use a hearth rounded and tapering at each end. The fire-slot widens toward the bottom, so that the pellets in dropping may have draft. The hearth is made of soft wood, while the fire-stick is made of the hardest wood obtainable, and is pointed with resin.

The Hupa Indians of California use a hearth-block of hard wood, and a drill of soft wood which has been charred on the grinding end. It is much easier to start a fire with a fire-set which has been for some time in use than with a new one; and therefore the set is usually in the care of the most skillful fire-maker, who wraps the parts carefully with long, narrow strips of buckskin, and keeps them beneath his blanket where they will not become damp.

An Indian takes great pride in being a quick fire-maker. Captain J. G. Bourke, U. S. A., reports having seen the Apaches secure fire with this simple apparatus in eight seconds. Under the most favorable conditions the Apaches claim to be able to make fire with a series of motions that occupy exactly two seconds. If this can be done, the Apache

is the most skillful fire-maker on record. One can scarcely strike a match in less time.

Many tribes can produce fire in less than forty-five seconds; and nearly all tribes resort to many devices, using flint and steel at one time, the fire-drill at another, or, if unable to obtain either of these, they can produce a spark by rubbing one dry branch up and down another. In some tribes the fire-making is considered women's work, beneath the dignity of a warrior, and left wholly to the squaws; but Sir Harry H. Johnston, the African explorer, reports that in some parts of equatorial Africa, where the usual methods of fire-making are much the same as in those tribes where this is the peculiar task of the women, the art "is the exclusive privilege of the men. The secret is handed down from father to son, and it is never, under any conditions (or so they say), revealed to women." When asked the reason of this, the natives replied: "If women knew how to make fire they would become our masters." In southern Africa the hearth is a log; and the Africans are so much less expert with the fire-drill that the whole strength of two men is often exhausted in producing fire. One man whirls the stick until both hands have descended almost to the lower end, then the other man begins at the top and continues the movement while his companion waits to relieve him in the same way. The second man also keeps the dust close to the point of the whirling stick, and gently blows it into a flame at the proper time. The African's clumsiness in fire-making, and the fact, before referred to, that he does not use the products of his forge to strike a fire for its lighting, is one of the interesting and curious anomalies of savage life.

DEER SKIN TINDER-BOX

The Eskimo has added a curious feature to his fire-drill,

The drill and hearth are in most ways very similar to those already described, but he whirls the drill, instead of between his palms, by the aid of a cord which makes one turn around the drill at about the middle of the stick. This cord is usually made of the rawhide of a seal or other animal, and it is tied at each end to a handle cut from a hollow bone, or fashioned out of a bear's tooth or a bit of wood. In order to keep the stick in place in the shallow fire-hole it must be held at the top; therefore there is a fourth piece of apparatus necessary. This fourth piece is usually a flat, straight bit of bone or ivory, in which a socket is made to admit the upper end of the drill, as will be explained.

When one man is to make the fire this top-piece is held between the teeth. A civilized man can scarcely endure the jar on the jaws and head produced by whirling a stick thus steadied by a block held between the teeth. Among the Eskimos it is seldom necessary for a man to make fire alone. It is a matter in which all have an interest, and two men usually make it together, each pressing the top-piece with one hand and each holding one end of the whirling cord with the other.

WHEEL TINDER-BOX

The top-piece is sometimes merely a block of wood, ivory, or bone, but is more often elaborately carved to resemble a seal, bear, whale, or walrus. The upper part is raised to form a good grip for the teeth, and many of the specimens in our National Museum are chewed in a way that shows the power of the Eskimo jaw. When the piece is intended for an assistant to hold in his hand, it is larger and has no teeth-grip. In the under part of the top-piece there is a cup-shaped hollow, set with some stone having antifriction qualities. These stones seem to be chosen for their beauty. They are mottled,

striped, or beautifully ringed. Against this inlaid stone in the hollow the top of the fire-drill rests and revolves easily.

An improvement on this four-part fire-drill is the attaching of the whirling cord to a bow. This enables one man to whirl the stick with great rapidity, and if he holds the top-piece between his teeth or against his breast (when it is made broad and of convenient shape), he can start a fire or drill a hole easily alone. The bow is evidently an improvement on the handled cord, and is an ingenious idea. These bows cannot easily be carved, as are the top-pieces; but, true to his passion for elaborate decoration, the Eskimo makes the bow of the gracefully curved ivory tusks of the walrus, and, after working them down, covers the surface with the most lively and graphic engravings of the reindeer, whales, seals, and bears he has killed, or with a picture-history of his hunting and fishing expeditions.

The hearth is especially adapted to the snowy home of the Eskimo. Should the heated pellets of powder fall through the slot to the ice-covered ground they would never ignite. The Eskimo, therefore, cuts steps in his hearth so that the pellet will fall to the lower step. Some hearths have a central hole to which the slots from the other fire-holes lead. At times the central-hole hearth and the slot-and-step hearth are both used in the same tribe. The Eskimos also have "fire-bags" made of sealskin, and often embroidered with excellent needlework, in which to carry the drill and the tinder, so that they may be kept very dry. The down of the arctic willow is used as tinder. The use of these sets for fire-making is probably secondary. They were undoubtedly used primarily for boring holes in wood and bone. When used for boring, the drill is tipped with flint or bone. The mouthpiece usually has a hole in one end through which a cord can be tied to secure it to the other pieces, so that in moving it may not be lost in the snow.

Fire-making by sawing was perhaps suggested to the Malays

by nature. It is said that jungle fires are often started by the rubbing of the bamboo stocks together in high-wind storms. "The creaking of the bamboo is indescribable; the noise of the rasping and grinding of the horny stems is almost unendurable" during these storms, say travelers.

However the method may have been suggested to them, it is a very simple one. A piece of bamboo, having a sharp edge, is rubbed across a rounded piece in which a notch has been cut. The Malay saws across until the hollow convex piece is

LEATHER FIRE-BAG

JAPANESE STEEL, MOUNTED IN WOOD, FLINT, AND TINDER-BOX

pierced. The heated particles fall below and ignite. Some Malays "have improved on this by striking a piece of china, tinder being held with it, against the outside of a piece of bamboo, the silicious coating of the latter yielding a spark, like flint;" but the sawing knife is more commonly used. Sand is sometimes added to increase the friction. In some places, when the particles fall they are gathered in a dry leaf and swung around the head until the leaf blazes.

The plowing method seems to have sprung wholly from the Pacific Islanders. It is closely connected with the sawing method. A soft, corky bit of wood is picked up near by, and a small, pointed stick of hard wood is found. Kneeling on the hearth or soft stick, the man holds the pencil-like plow between his clasped hands, somewhat as one takes a pen, and forces it forward at an angle of about forty degrees, slowly at first and

then with increasing rapidity until the wood is ground off and forms in a small heap at the end of the groove he has so made. The groove is about six inches long. Mr. Darwin found it difficult to make fire in this way, but at last succeeded. The Samoan can get fire in forty seconds, and some can make the wood burst into flame by this method.

The fourth method of obtaining fire—that of "striking" a light—is one familiar, in a degree, to all. Before steel was obtainable, flint and pyrites were used. Eskimos of the Mackenzie River district use a fire-set composed of a tinder-pouch, which contains tinder made of down from the willow catkins mixed with charcoal, or soaked in gunpowder and water, a rough bar of flint, and a half-sphere of pyrites, evidently a round stone broken in two for greater convenience.

The tinder-bag is made of reindeer skin. A little bag hanging from the larger one contains tinder to use in case that in the larger one becomes accidentally useless; but the little bag also acts as a toggle. It is passed under the belt when the tinder-bag is carried by the squaw, much as our women wear their chatelaine-bags. The cover of the bag is an oblong pad stuffed with deer hair. This pad is held on the forefinger under the pyrites to protect the hand when a spark is being struck off into the tinder in the bag.

With the Iron Age came the use of the flint and steel, and the most ancient specimens of these fire-making tools are so nearly like those found in many an old garret to-day that description seems unnecessary. Various devices were invented to improve the common strike-a-light. One of these was the wheel tinder-box. The wheel was spun by sharply pulling a cord which had been wound around its projecting axle, much as one spins a top. The flint was pressed against the whirling wheel, and a shower of sparks fell into the tinder within the box. The pocket strike-a-light is still used by the peasants of France for lighting their pipes.

The Chinese strike-a-lights show a very ingenious way of

combining the steel with a pouch in which to carry the flint and tinder. In Tibet the pouches are often elaborately trimmed with incrusted silver set with costly jewels.

The Ainos of Japan have a particularly convenient fire-set. The shoe-shaped steel is fastened with a piece of sinew to the cork of a wooden bottle containing the soft charcoal used as tinder. Besides the small piece of flint, there is also a curious fire-stick which burns like a slow match for a long time, and a pouch of twined and woven rush in which to keep these articles. "The Aino takes out the cork with the steel attached, and stirs up the tinder with the sharp point. He then holds up the flint in his hand over the box, and strikes a spark down into it. He transfers the coal to his pipe, or material for fire, or fire-stick, with the point of the steel."

STEEL FLINT AND DEER SKIN POUCH

The Japanese still use flint and steel. Their tinder-boxes have two compartments. The smaller one is for the tinder and has a damper. The larger one is for the flint and steel. They mount the steel in wood. A picture on page 10 shows that until matches were invented, the most convenient fire-making tools in the world were those used in Japan.

Our North American Indians were slow to acknowledge civilized arts and methods as superior to their own; but fire-making with flint and steel appealed to them at once, and was promptly adopted. Buckskin pouches were made in which to carry the flint and steel, and hung from the belt beside the tomahawk. They have many curious beliefs concerning fire and its origin. The Alaskan Indians will tell you that "Yetl," the Great Raven, who created man and gave him all blessings, after obtaining light and fresh water, stole a burning brand from a fire island (volcano) in the sea, and started back to earth holding it in his beak. But the journey was so long that

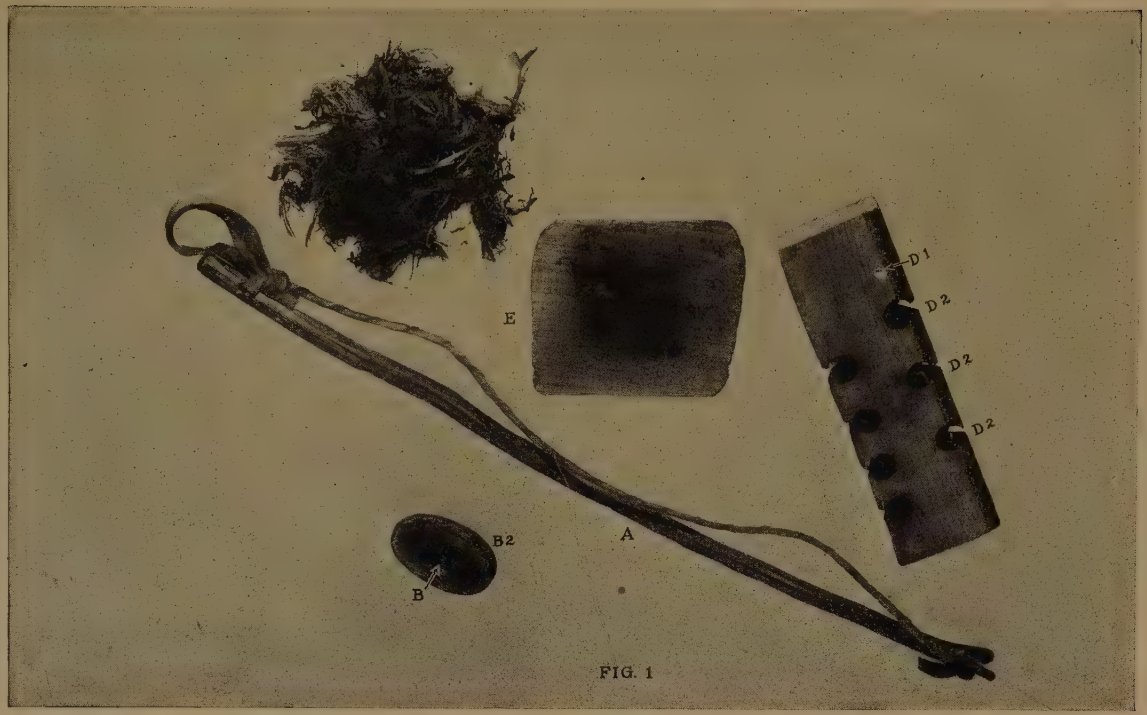


FIG. 1

MAKING FRICTION FIRE WITH HOME-MADE RUBBING STICKS

The necessary equipment

MAKING FRICTION FIRE WITH HOME-MADE RUBBING STICKS

Upper—The operation. *Below*—Blowing the feeble sparks into flame

the brand burned shorter and shorter. Swiftly and more swiftly Yetl plied his magic wings; but the brand burned his bill, and then dropped to the ground and scattered in all directions. And because the divine fire, dropped from Yetl's beak, entered into every rock and every dry bit of wood lying on the surface of the earth, they say one can always call fire out of the rocks by striking them with steel, or out of wood by rubbing it with other wood.

This is the Alaskan explanation of the mystery known to us as fire-making.

HOW ANY ONE MAY MAKE A RUBBING STICK SET OF HIS OWN

By PHILIP D. FAGANS

FIRST of all remember that to be able to make fire with materials you have gathered and put together yourself is quite some feat of handicraft and woodcraft. In addition, it requires considerable strength and skill. Study the illustrations.

A Bow.—Get yourself a bow (A), say twenty to twenty-four inches long, of osage orange, hickory, oak, or any strong wood, averaging about three-quarters of an inch thick, and, if possible, with a branch at one end so you can have a hook on which to fasten your thong. It should bow a little, but not too much. Dry it out for a few days near a furnace. Make a hole in the bow at the butt end. A red hot poker does a good job.

A Socket.—Find a hard knot like hemlock. Better still, locate a piece of stone (soapstone is good), either with a hole in it or one in which you can make a hole, say three-eighths of an inch across, and one-quarter inch deep. Sink this small stone in a small block of soft wood (B), which is two by three inches, and round off the corners so as to make a socket like B_2, which will fit the hand comfortably.

A Thong.—Get a strip of leather. Buckskin is best, though rawhide will do if you can get the grease out without making it hard and stiff. Fasten one end on the crotch end and twist the thong so it is a tight spiral all the way down. Slip the other end through the hole in the bow and pull reasonably tight. The skin will stretch considerably at first and will have to be tightened several times after using.

A Base Board.—Get some dry straight grained balsam fir (white cedar, red cedar, cypress, or basswood), about an inch thick and fifteen inches long and four or five inches wide. Split off a strip about an inch wide and from it whittle a stick or drill shaped like C, Figure 2—long shoulder at top, short point at bottom, and perfectly straight.

Take your other board, which should never be less than two inches wide, and with the point of your jackknife make a notch that is deeper on the bottom side than on the top side, like D at D1. Estimate so that the point of your drill will hit a spot that will leave the outside of the drill near the edge and yet leave a little margin. Make a small hole for your drill point by twisting your knife.

Spark Board.—Get a piece of board, thin like a shingle or a cigar-box lid, to put under the base board, like E.

Tinder.—Get some dry cedar bark and shred it between your hands to make it soft, like F, or get a mouse's nest for tinder.

To Get the Hole Ready.—Place the thin board under the base board and, kneeling, put your left foot on the board in the position shown in the photograph (Figure 3). Twist the drill in the thong of the bow. Put short point of the drill in the hole in the board and put socket on the top of the drill. Hold the socket with your left hand, holding your wrist firmly against your shin-bone. With your right hand push the bow back and forth so as to revolve the drill. (You hold it against the shin-bone to steady the drill and also to give you greater pressure on the socket.) When you have burned a hole in

the board, take your knife and open the notch so that it connects with the hole, as in D2, Figure 1.

To Make Your Spark.—You are now ready to get your spark. Hold your drill perpendicular, and your bow parallel with the floor, and keep your wrist against your shinbone. Twirl the drill until you get lots of smoke and a notch full of powder. Carefully take off the base board. If the pile of powder smokes, you have a spark. If it does not smoke, you have failed and must try again. Pick up the spark-board and fan the spark with your hand gently until it glows.

To Get the Fire.—Carefully place some shredded tinder over the spark and hold it so the spark cannot blow away and yet will not be put out.

Blow with long breaths until you have a blaze, as in Figure 3.

If your material is right and you have followed these simple directions, shortly you will get your fire. If you do not succeed, *try again and again until you do.* When you have once learned the principle and gotten onto the knack of it, time yourself carefully, striving always to beat your own best record.

FIRE—AND LIFE—AND DEATH *

By DILLON WALLACE

Editor's Note.—Before you read this story of "Fire—and Life—and Death," by Dillon Wallace, I want you to know him.

It was in June of 1903 that Mr. Wallace went with Leonidas Hubbard on an expedition to Labrador to map out the country, study the Nescaupee Indians, the most primitive of North American Indians, and particularly to be present at Lake Michicamau when the caribou migration was on. The tale he tells of how they missed the right trail, how eventually they had to turn back after a far-off glimpse of Michicamau, or Big Water, and how in their race for life Hubbard died from starvation and exposure, while Wallace was picked up one morning as he sat by a smoky fire, the smell of which had guided the Indians to him, is one of the most thrilling stories I have ever heard. Mr. Wallace likes boys. I have had him in my camp, I have seen him in his own, and heard him tell tales to a canoe party on the crooked shores of the Tippecanoe River in Indiana.

Here is a picture of Mr. Wallace beside the very tent used on his second expedition to Labrador. —*Philip D. Fagans.*

WE CAN do without blankets, we can do without tents, and for four or five days, or even longer in a pinch, we can do without food, but we *must* have fire. Matches—

* By courtesy of *The American Boy.*

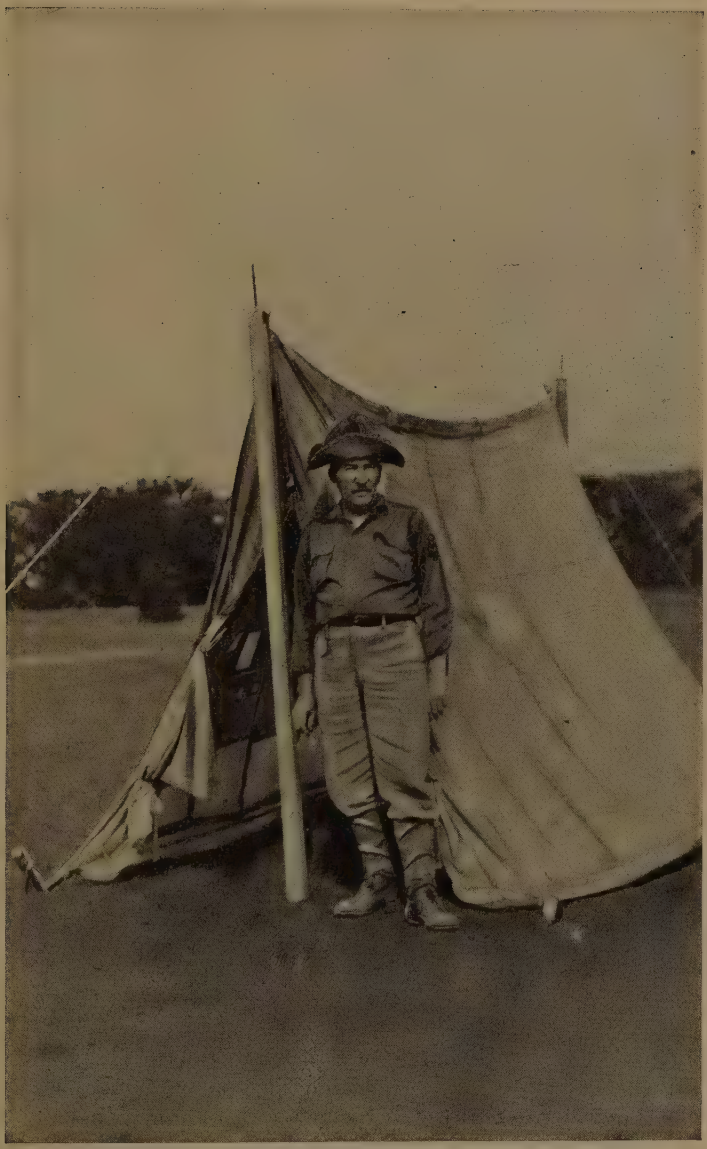
matches and an ax—should take first place in a camper's outfit, and a thorough knowledge of their use first place in his out-of-door education.

I have been through the mill. I speak from personal contact with the open places. In the course of the years that I have spent in exploration and wilderness travel, and as a plain garden variety of camper, I have run the whole gamut of experiences. I have known the frigid blasts of Arctic winds and the burning heat of the Tropics. Without tent or blanket or food I have existed for days at a stretch in the snow-clad forests of the North; but, thank God, I had matches and knew how to use them, else my body would long ago have been food for wolves and foxes, and I would not be writing this to-day. Not once but a score of times have matches saved my life.

This calls me back to the Summer and early Winter of 1903, and the most trying of my experiences when my companions and myself were fighting for life in the bleak wilderness of Labrador. There were three of us—Leonidas Hubbard, Jr., the young explorer, George Elson, a half-breed Cree Indian and myself. Our explorations had carried us far into the interior, deep into regions no white man had ever before seen, and, I may add, has never since visited.

We could not carry sufficient food to meet our needs, and therefore were depending for our living upon the fish we caught and the animals we killed. It was one of those years when, for some unexplained reason, game was scarce. These years of scarcity come to every wilderness sometimes. There are seasons when the Indian hunters of Labrador fail to find caribou, and then it happens that many Indians starve to death. No man can predict when these hungry years are to visit the wilderness. They are terrible when they come, and our little party fell upon one of them in 1903.

Caribou were not to be had that year. Our guns failed to secure for us our living. We depended chiefly upon fish, and when the cold days of September came the fish declined to



DILLON WALLACE

accept any lures we could offer them. We had no shotgun, and when fish failed us we subsisted upon the few birds we succeeded in killing with our pistols and rifles. Hunger tortured us. We were in the end driven by necessity to eat even the entrails of every bird and fish we captured. We scorched the bones in the fire until they became brittle, and ate them. Nothing that could be eaten and contained nourishment escaped us.

We were wasting away in flesh and strength. We were gaunt and our knees grew weak. Our clothing was in tatters, and our moccasins barely held together upon our feet. In our effort to reach a fur-trading post at the head of Hamilton Inlet, the nearest permanent habitation, it was necessary for us to carry our canoe over long portages between lakes. When we entered the country, and in the course of our inland journey, one man carried the canoe easily. We had grown so weak at the time our retreat began that it was now an ample load for two. Every day we grew weaker, and at length a day came when the combined strength of the three of us was not sufficient to lift the canoe. We were forced to abandon it then.

Frozen ground, snow and cold rains, hardly enough food to keep body and soul together—these were the things we had to contend with. Ah, how happy we would have been to put our teeth into a wasted crust of bread from a city garbage can!

Our fight for life would have failed early, but for the plentiful supply of matches. A rousing fire at night, and at times when exhaustion compelled rest during the day, warmed our blood and kept us alive. We knew how to light fires. Wind and snow and rain could not prevent us. Fires kept us alive. One day without a fire, and we would certainly have perished. The grim spirit of Death was our constant companion on the trail and in camp, and we knew it.

We were a hundred miles from the trading post and fifty miles from a trappers' shack where we were hoping against

hope that we might find men and provisions, when Hubbard collapsed. He could walk no farther. His legs would no longer carry him.

It was the evening of a bleak October day when this occurred. The air was raw, the clouds hung low, and a storm threatened. We pitched our tent before a big rock, threw back the front to receive the heat from a fire built against the rock, I made a bed of boughs for Hubbard, and then we held a conference.

Our situation was critical, and I believed at the time little short of hopeless. Twenty miles below our camp we had left, on our inland journey early in the Summer, a bag containing about six pounds of wet flour that was spoiled. Thirty miles below that was the trappers' shack. If the trappers were there and our strength would permit us to reach them and summon them to our assistance, we might save Hubbard's life. If they were not there none of us could hope to escape with his life.

The result of our conference was a decision that George and I should pile up wood for Hubbard's use, and make him as comfortable as possible with the means at hand. Then we would try to find the spoiled flour. If we found it, George would take a part of it and make a desperate effort to reach the trappers' shack, while with the remainder of the flour I would return to Hubbard and wait with him for assistance to come to us. It was a forlorn hope, but death held no terrors for us then. We had grown familiar with it. I can say, for myself, at least, that, in the days that followed, to think about dying seemed as natural as to think about going to sleep at night. It offered rest. I believe the Almighty prepares us for it, and robs it of its terrors, when the time comes for us to go.

We were astir before light the next morning. When George and I had finished our preparations to leave, Hubbard asked me to read him the fourteenth chapter of John and the

thirteenth of First Corinthians. When I had closed the Testament and put it away I was quite overcome with the realization that the time of our parting had come. Instinctively I felt that we were parting forever upon earth. I embraced Hubbard and we kissed each other's cheeks. Then the half-breed and I left him.

A cold east wind was blowing. It drove the rain into our faces in sheets. We were without coats, but we had cut a blanket in two, and each of us wrapped half the blanket around his shoulders. We carried no other blankets, no tent, and had no other protection.

In our weakness, progress against the driving storm was slow. That night, with our half blankets drawn over our heads, we huddled close to a fire. At midnight snow began to fall. The following evening—the second after leaving Hubbard—we found the spoiled flour. It was a lump of green mold, and of almost no value as food, though we ate some of it, and when we divided the remnant between us, each had a pitiful little lump of mold weighing less than three pounds. It was the only food we possessed. The next morning we parted, George to search for the trappers, I to endeavor to return and rejoin Hubbard.

There had come a sudden drop in the temperature, and it must have been below zero, for the swift running river froze in a night. Snow fell constantly, and was rapidly deepening. Walking became all but impossible, but I floundered on during daylight hours. Every night I made a fire. I wonder now, sometimes, how I accomplished it in my weakened and exhausted condition. I had no ax, and even had I possessed one I would not have had the strength to wield it. Previous to this I had lost my jackknife. With bare hands and matches, in driving snow, I made my fires. Only with long practice that has made the art of fire-making almost an instinct could this have been possible.

For ten days after parting from George, I fought alone for

life in the bitter cold and driving snow. I had no food. During this time I ate my moccasins and walked in stocking feet, and my feet were frozen. My trousers hung in shreds from my hips, and torn underclothing left my legs partly bare and unprotected.

The time came when in imagination I heard men shouting to me, and I answered. But there were no men. Friends who had been dead for many years talked to me, and encouraged me. I lived in delirium, but I never lost the instinct to light a fire at night when I stopped in my vain, floundering search for Hubbard and the tent, and the fires kept the breath of life in my body. I could not have survived a single night without fire.

Then came a morning when I could walk no farther. I could scarce stand on my feet, and I could no longer gather sticks for my dying fire. It was that morning, when my last fire had nearly burned itself out, and my life's fire too was flickering, that the trappers came. George, the half-breed, had found them. He had killed two porcupines with a stick, and their flesh had given him strength to reach the trappers' shack. The men were on snowshoes, and that day they found Hubbard, too, in his tent, but he was dead.

There are many other personal experiences that I might recall when the knowledge of fire-making saved my life. These experiences, to be sure, were in a great, unpeopled wilderness, but now and again people are lost in our own nearby woods, and perish only because they have no knowledge of fire-making. Several years ago two young men came into the country, not far from my home, to spend a week end. This was within fifty miles of New York City. They wandered into the woods for a tramp. Night fell and rain set in, but they did not return. It was late October, and the weather was raw and cold. The family with whom the young men were stopping became alarmed at their failure to return, and the following morning a searching party set out. During

the forenoon the young men were discovered so chilled and exhausted that they were unable to walk. They had lost their way. Both had matches and jackknives, but neither knew how to light a fire in the rain, and the matches were wasted in vain attempts. They had never learned or practiced the art of fire-making. They would have been comfortable and safe enough with a fire, but without one neither of them could have survived another night of exposure. As a result of their inability to use their matches, one of them developed a bad case of pneumonia that nearly cost him his life.

Let me repeat, the first requisite of a camper's outfit is matches, and his first lesson in camping should be the art of fire-building under any and all conditions.

Fire-making in the open is an art. It must be learned by practice and experience. I might write and you might read volumes upon it, but you cannot master it in that way. *You must do it yourself in wet and dry, stormy and clear weather.*

Anyone can kindle a fire in dry weather with paper for tinder. That isn't the way to play the game. In the woods you must rely upon what primitive nature supplies. Before you can truly call yourself a camper you must have the lessons of fire-making so well learned that when you go into the woods you do so with the confidence that you can make a fire whenever you need one.

The first requisite is matches. A sufficient supply for all probable emergencies should be carried. The camper who fails to do this should be attended by a guardian. My own method is to have matches, secure from injury by moisture, packed with other supplies in every duffel bag in my outfit. In my pocket I always carry a rubber waterproof match-box, and am careful to keep it filled. A small, corked bottle will serve if nothing better is available. Matches, then, should be at the top of the check list.

"But," you ask, "how about fire sticks?" Fire sticks are well enough to experiment with as a stunt. You must keep

them dry. They are cumbersome to carry, and occupy much more room and are heavier than matches. The material from which they may be made cannot be had in emergencies, or in wet weather, save under extraordinary favorable circumstances.

"Flint and steel?" you ask. Flint and steel are all right if you are expert in their use, but matches are more easily kept dry than the necessary tinder for flint and steel. The day of fire sticks and flint and steel has passed, just as the day of the stage-coach has passed.

The ax is next in importance. If a man has learned the art of fire-making right down to the ground he can get a fire with jackknife and matches in any woods, but it is a tedious job sometimes in wet weather, unless he knows just how to go about it, and circumstances and conditions vary. An ax makes the way safe, and with an ax a comfortable shelter may also be made with comparative ease.

In dry weather it is easy enough to get a fire. A handful of dry leaves—a few twigs and some larger sticks—a lighted match applied—and you have it. The test comes on a day when everything is wet and rain or snow is falling and everything is getting wetter. Then it is that you must know how.

Look around for a dry stick. Standing wood is better by far than wood that has fallen. Soft woods, such as pine and spruce, when they are to be had, light more easily than hard wood and make the best kindlings. Hard wood, after the fire is started, makes the better and steadier fire. Fell the dry stick, cut off two or three short lengths, and split them. The heart of the stick will be found to be as dry as a bone. Cut some of the splits into fine kindling wood.

Now, with your jackknife, whittle shavings. Don't make the shavings short and stingy. Cut them five or six inches long. Stop the knife-blade just short of the end of the stick until six or eight shavings have been cut, then, with a twist of the blade, break the bunch loose. In this way the shavings

will be held together in bunches. There should be at least half a dozen of these bunches, before any attempt is made to light the fire. Patience and care is the price of success. Haste and insufficient preparation ends in failure.

Observe the direction of the wind, and lay the sticks an inch and a half or two inches in diameter upon the ground, their ends together and at right angles to each other, the inside of the angle toward the wind. Now hold the butt end of one of the bunches of shavings in the left hand and with the right hand light a match and apply it to the thin end of the shavings. When the shavings are well ablaze, lay the butt upon the cross sticks, where they come together, and on the inside of the angle, with the small end of the shavings on the ground. This permits the flame to climb upward. Now quickly, but carefully, lay the remaining bunches of shavings upon this, the thin shavings upon the fire, the thick ends being supported by the two sticks.

The split kindling wood is now to be applied and carefully arranged, and don't monkey with it after it is once arranged. If there is any fire at all the probabilities are that it will come through and ignite the splits, though it may do so slowly. Give it time.

The secret of building a fire lies largely in the arrangement of the wood. The blaze *must* be fed with a draft from underneath. The wood *must* lie so compactly that one stick will ignite another, but not so compactly as to exclude a free draft upward.

A fire should never be made in a hole. The tenderfoot or uninitiated invariably digs a hole or builds up a fireplace with stones. In all my experience in camping with professional campers and hunters who live their whole life in the woods, I have never yet seen one make a fire in a hole, or build up a stone fireplace. The former is unscientific, the latter a useless waste of time and energy.

A small fire is the only expedient fire for cooking, unless it

is to roast meat or fowl. As I have often asserted, I can cook a dinner of coffee, bacon, and flapjacks with no more wood than I can carry in my hat.

Small wood is all that is needed for cooking—stray sticks. For heating, larger wood that will not burn out too quickly, is better, and hard wood is preferable. Even for heating I prefer the Indian method of a small fire that one can draw close to, rather than the white man's method of a roaring big blaze that drives one out into the background. The Indian way consumes less wood, too.

If there were space, I would like to describe the different sorts of fires to be used for different purposes. All of them are started, however, in the same way—two sticks laid at right angles to serve as supports for kindling wood until the blaze is assured. Then the fire may be made big or kept little, according to the needs of the campers.

The sure and certain way of getting the fire started is with shavings and split kindling wood, as described. When dry leaves and sticks are to be had, it is not always necessary to cut the kindlings. In Labrador we sometimes used for tinder the hairy moss, which hangs from the inner limbs of Northern spruce trees. But whatever tinder is used, and whatever the conditions, the wood must be carefully placed to insure draft and contact.

One division of the Igorrate tribe possesses the fire syringe, by which fire is produced by rapidly compressing air, rather than by the friction process used among the other tribes. This syringe works on the principle of a piston or plunger forced to the bottom of a small churn-like cyclinder and quickly withdrawn. The compression produces a spark which ignites the plunger and the fire is made quickly and easily. This is a very complicated process and it is a matter of wonder how these primitive people have learned it. But it has a decided advantage, for by it fire can be made even if one is out in the wind and rain.

KINDS OF FIRE AND THEIR USES

By FRANK H. CHELEY

The Conquest of Fire

FIRE has sometimes been called "The Gift of the Gods." Kipling calls it "The Red Flower that blossoms at night." If fire should suddenly be taken away from the human race, in an incredibly short time it would slip back, through the centuries, to the crude beginnings of savagery. Fire runs our machinery—at least is the power behind the engine that furnishes electricity and steam. It is the very soul of progress; and yet how little thought we have come to give the Great Red God! Yet, just as home life and business and industry are built about and dependent on fire, so is the camp. Would you really care to camp with no fire? It would of course be possible for a limited time, but it would be camping with the joy left out, for, besides the values of physical warmth and cooking heat that come from it, there is the never-ending comradeship and inspiration of a glowing heap of live coals as the dark shadows of night close in about you. What would stories be, or songs, or friendly chat without the mellowing, bewitching influence of the fire? Most certainly the camp fire is the very heart of any camp.

It is not hard to understand why the cold and naked savage came to worship fire or how he slowly but surely discovered and began to understand the Giver of the wonderful gift, and so *through* fire, who can say, but that man found God. Then, crouched about its warmth and glow, in tribes and clans, camp fashion, the spirit of comradeship one for another began to grow and grow, until it blossomed into brotherhood

and service. Fire has been the most potent influence in the development of civilization.

An unknown writer meditates about it thus: "Who does not love to watch a fire as it springs from its smoke-sheath and dances swiftly from log to log, wrapping them about with its glowing mantle of flame? It is a master magician who touches dull wood or coal with his wand, releasing the bright spirits of light and heat that are imprisoned within them. In some mysterious way it also liberates our imaginations, opens some door within us that is generally closed, so that we dream and plan, expand into temporary poets and philosophers, sound depths and soar to heights never explored except under the influence of fire.

A STONE FIREPLACE

"Friends, lovers, comrades need no conversation when in the presence of an open fire, for it croons and sings and dances for them, writes fiery sonnets upon the dark scroll of the sooty back logs, and sketches charming pictures with its smoke pencil.

"It is the prince of entertainers, the king of hosts! It offers bewitching divertissement, runs the full gamut of ceremonious amusement for your benefit, then skillfully decoys your best thoughts from their hiding-places.

"Like a genial host, it removes all trace of the self-consciousness that cramps and dwarfs expression, for, looking into its heart, we find there inspiration unmarred by thought of self."

No doubt at all but that fire is the camper's very best friend, and therefore, he should learn early as much about it as possible and how to use it to the best mutual advantage, for no matter how far from home, how dark and stormy the

night, or how weary the body from long hours on the trail, a camp-fire dispels the gloom, brings cheer, and makes any spot in the wilderness—home. Therefore, learn to become an expert in the use of the open fire.

Kinds of Camp-Fires

There are many, many kinds of camp-fires—probably no two seasoned campers build their fires alike or use them for exactly the same purposes, yet each is positive that his is the "best way." However, all camp-fires may be roughly divided into four types, each type with innumerable variations according to the country, fuel available, and the number in the party.

First is the Indian fire—small, compact, hot, and useful for both warmth and cooking.

Second, the various sorts of cooking fires that have been evolved by the modern camper.

Third, the various types of night fires that range all the way from the compact green-back-log-reflector fire to the altar, tepee, and friendship fire.

Fourth is the less often used, but nevertheless important, group of signal fires.

Every camper should learn early how to best construct, maintain, and control some examples of each of these types, for on his fire ability will rest very largely his comfort, health, and pleasure. A good, well-constructed fire is the mark of a seasoned camper.

The Indian Fire.—This is a general utility fire and has the advantage of being quickly built, uses the minimum of fuel, is easily controlled, and, if unfed, burns out quickly. It is excellent for cooking a simple meal desired in a hurry, inasmuch as it focuses the heat to a point and allows one to work at it easily from any side. It is usually built by laying the selected wood, cut into short lengths, butts together, while the

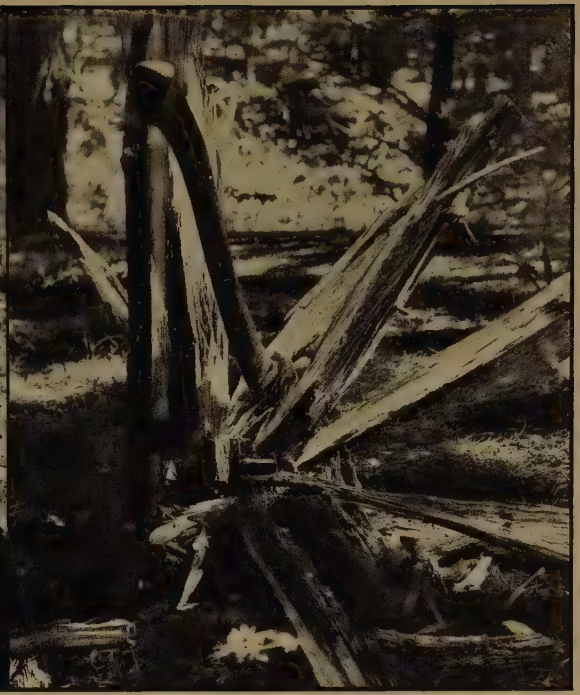
lengths radiate like the spokes of a wheel. On these sticks smaller ones are arranged, usually about a fuzz-stock, a little heap of prepared slivers, pine-cones, bark, or the like. The ends of these spokes soon become ignited from the small stuff and, as they burn, are pushed up together along with other small sticks that are added from time to time. The size of sticks used should be determined somewhat by how long and for what purpose the fire is built. If made thoroughly and with care, one match will always light it; allow for plenty of air circulation about your fuzz-stick and through your chips and bark.

Another form of the Indian fire is to start by building a small hollow square of dry sticks, pigpen fashion, filling the center with chips, litter, a fuzz-stick or two, and then adding heavier sticks about the sides by standing them on end so as to form a tepee. Both forms are equally effective and easily handled.

Either form is excellent for use under a pair of crotches and crosspoles for boiling coffee, soup, and the like. The distance from the pole to the top of the fire may be easily arranged by the use of letter S wires or homemade pothooks or trammels, as illustrated. If the ground is stony and it is difficult to drive crotches, a pole may be supported and adjusted by using a rock, a stump, or X, fastening the end of the pole by means of a peg. Many variations of this method will suggest themselves to the ingenious camper. For a small party much on the move, the Indian fire is probably the best and simplest of all.

The Cooking Fire.—The white man depends upon a frying-pan and kettle for most of his food, and does not wish to bother with crotches and pothooks, especially if he is going to stay some time in one place. He prefers to build a regular cooking fireplace. This is an exceedingly simple affair and can be put into working order in a few moments with the aid of a sharp ax.

ONE OF THE BEST OF THE VARIOUS SORTS OF COOKING FIRES EVOLVED BY MODERN CAMPERS



SLIVERS OF FAT PINE MAY BE READILY GOTTEN FROM STUMPS AND ROOTS

TYPES OF SIGNAL FIRES

Cut two green logs (hard wood preferred), four to six feet in length and five to eight inches in diameter. Bark them and flatten them both the full length, on one side. Place them on the ground, flattened side up, so that they nearly touch at one end and spread in a V shape at the other, with the mouth a foot to eighteen inches wide. Be certain that they lie *in* the wind, so the draft will be through the mouth and out the apex of the V. Build your fire about where your largest kettle or pot will set across the logs and gradually lead it as far toward the apex (by adding fuel), as you need for your cooking purposes. If you lay all your fuel before lighting your fire, the wind will soon have it all aflame. If this is what you want—very well.

If the ground is uneven, a few green stakes will help you. Bank dirt or moss against the outside of your logs so as to shut off counter-drafts and to keep your logs from rolling. By a little careful manipulating you can have a very hot fire under the stew kettle, a reasonably even heat under your frying-pan, and a good simmering bed of coals under your coffee-pot—flames for your pot and coals for your pan.

If the weather is windy or a cold wind blowing, a wind-break can easily be put up that will pay well, for not only are blowing sparks dangerous, but very disagreeable to the cook, who, out of pure necessity, must bend pretty close to his fire at times.

The fuel to be used in a cooking fire is of the utmost importance. Just any old logs, limbs, or branches that happen to be handy won't do. Don't be lazy—get the best fuel available and enjoy the results. Never use soft wood for cooking if you can help it. It is dirty, short-lived, and fills all uncovered pots with ashes and soot, not to mention the somewhat disagreeable flavor it imparts to food. Red cedar makes a fine cooking fire, but crackles and throws treacherous sparks unless carefully watched. Aspen and poplar, when well seasoned, make a good cooking fire because of the large amount of ash which

holds heat a long time. This compensates in a measure for the unusually large amount of such wood necessary for such cooking.

Where there is a choice of fuel, select hard wood, not too large and not too dead. The heat-producing qualities of wood can be seen from the following simple table based on Forest Service experiments:

Shellbark Hickory	100	Hard Maple	59
Pignut Hickory	95	White Elm	58
White Oak	84	Red Cedar	56
White Ash	77	Wild Cherry	55
Dogwood	75	Yellow Pine	54
Scrub Oak	73	Chestnut	52
Apple Tree	70	Yellow Poplar	51
Red Oak	67	Butternut	43
White Beech	65	White Birch	43
Yellow Oak	60	White Pine	30

Horace Kephart, in his "Woodcraft," sums the whole matter of cooking fuel up in the following manner: "The thick bark of hemlock is good to make glowing coals in a hurry; also that of hard woods generally. Know what you don't want for fire, for example, when green, basswood, ash, balsam, box elder, buckeye, cucumber, black and pitch pine, white pine, aspen, yellow poplar or tulip, sassafras, sycamore, and tamarack. These woods will hardly burn at all when the sap is in them. Butternut, chestnut, red oak, and red maple, burn very slowly when green. Yellow birch and white ash burn better green than seasoned. Dead pine seldom burns well unless split. Green wood burns best in Autumn and Winter when the sap is down. Trees on high ground burn better than those on low ground.

"The best fuel is hickory, green or dry. It makes a hot fire, and lasts a long time, burning down to a bed of hard, long-lived coals. (This, by the way is a distinctively American wood, not to be found on any other continent.) Next in order

are the chestnut, oak, white, black, post and basket oaks, pecan, ironwood, dogwood, applewood, black birch—in fact all, birches—sugar maple, locust, and yellow pine."

No matter if the sticks are but an inch to an inch and a half in diameter, split them. They burn more readily and give better heat. A bed of live hard wood coal, six inches deep, will cook any ordinary meal in excellent shape and not parboil the willing cook either. If cooking much, keep a green poker with a sharp crook on hand for raking over the coals.

In case green hard wood logs are not available for your fireplace, of course use the nest bext thing. Very satisfactory fireplaces may be made in the same way with rock, especially if flat and blocklike. In some sections where thin flat stones are abundant, stone fireplaces, such as that shown in the sketch on page 26 are used. It is possible to fry meat, eggs, and even flapjacks on such stones with a little practice, and such a fire has the added advantage of being higher off the ground than a log fire, and thus makes so much stooping over unnecessary. Beware, however, of rocks that explode when in close contact with fire. These are dangerous. Rocks from a stream bed are very often guilty of this offense.

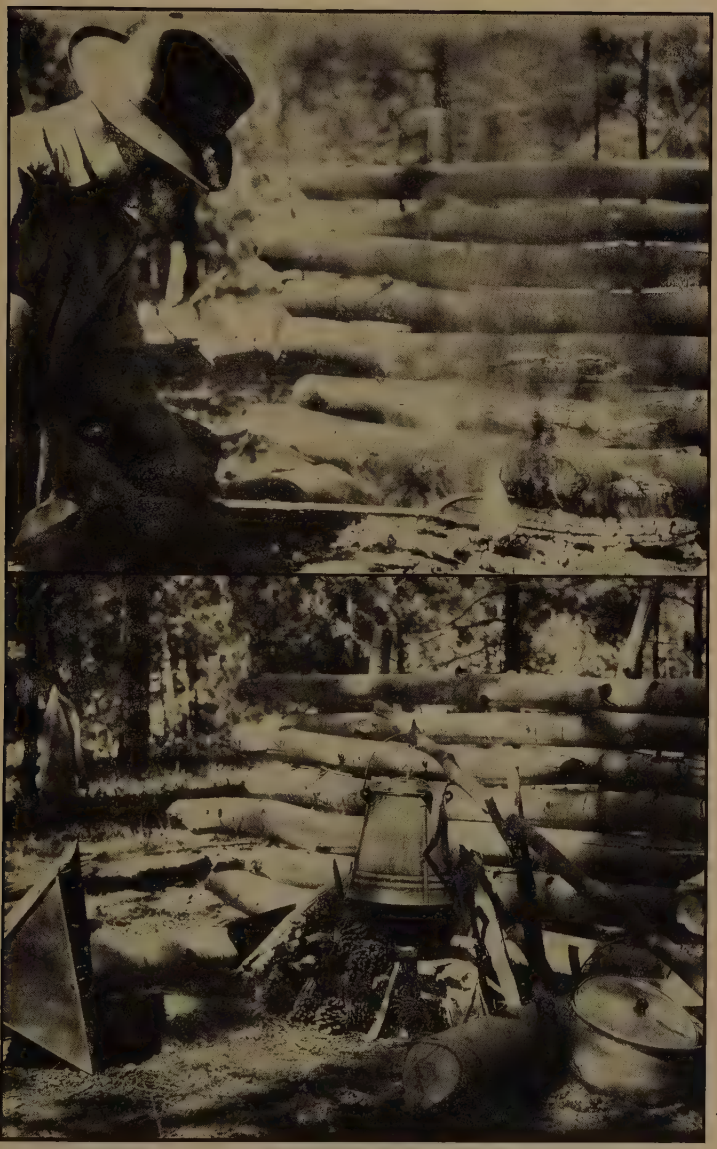
The Night Fire.—The night fire may be a tiny edition for two pals, constructed so as to throw its sleep-inducing heat far back under the lean-to shelter by means of a green-log reflector, or it may be a large friendship fire calculated to supply light, warmth, and cheer to a great circle of contented campers. Or, perhaps, there are to be stunts, games, or even an attempt at amateur theatricals, so that light and a bit of the spectacular are desired. There is a satisfactory type of night fire for every occasion.

If heat for the night and a good bed of coals for a quick breakfast is the prime essential, then the back log fire is the one to use. It is simply constructed, and is a great comfort when the nights begin to cool and the scouts of winter breezes begin to prowl around in the wee small hours of the morning.

Cut two green hardwood logs four to six inches thick and four feet long. Sharpen them carefully and drive them securely into the ground, approximately four feet apart, inclining them enough *away* from the fire so that the reflector logs will ride nicely, one on top of the other. (If the ground is so the upright cannot be easily driven, cut notches in them and brace with a shorter pole. Then cut two stout ground logs to serve as andirons. Make them long enough to be firm and solid. Then cut your back logs, putting the largest one at the bottom and in notches cut for the purpose in your andirons. Pile the others one upon another until you have a reflecting surface twenty-four to thirty inches in height. Then build either form of Indian fire in front of your reflector and add fuel as needed. Sufficient wood for the night should be cut, split, and piled conveniently before retiring. Such a fire, with a minimum of attention, will burn all night and keep a small party comfortable. If the bottom log burns, the next one above will drop into place, and so on till morning, supplying the fire with fuel. One soon becomes expert at building such a fire.

The Friendship Fire.—Generally, the "friendship fire" is but a large Indian fire. This is desirable because it is easily put together and burns out quickly, so that it is safe to leave upon retiring. Sometimes, however, especially in the mountains where fuel is very plentiful, a large fire is built by merely standing dead wood, tepee fashion, about a small dead tree or a pole planted in the ground for the purpose. Such fires should be built only in the open, when there is no wind. A safer fire is to cut the fuel into 8ft. lengths, build a loose, log cabin of it, filling the center with brush ends, stumps, and smaller material.

The Woodcraft fire is much the same, save that much smaller fuel is used and much less of it, so that the campers may gather closer to the blaze. Use seasoned wood so as to get the light without the heat. If fire is too large, the group must scatter and the friendship feeling is lost.



Upper—WAIT FOR A BED OF HOT COALS BEFORE BROILING
Lower—THE FIRST STEPS IN ARRANGING A NIGHT FIRE WITH SUITABLE BACK-LOG REFLECTOR

THE INDIAN FIRE

Small, compact, hot, and useful for both warmth and cooking; the base sticks laid like the spokes of a wheel

The hollow square type is preferred by some

The above shows the use of pot-hooks and trammels suspended from a cross pole over an Indian fire

For state occasions, where there are large amounts of brush to be burned, a very short-lived but spectacular fire may be built as follows: Plant four stout straight saplings—the longer the better, into the ground so as to form a square six to eight feet wide, then every six feet up, wire crosspoles as supports, so that a loose floor can be thrown on. On these floors, one above another, pile the dry brush to be burned, using the larger and heaviest stuff near the bottom. These floors should be close enough together so that the fire from one will set the brush on the one just above aflame. In a few seconds the entire pyramid will be one magnificent column of flame. Such a fire lasts but a brief while, and is safe if there is no wind and if built well in the open. If such a fire is to be built, especially on forest reservation, it is wise to get a permit from the nearest ranger and invite him to the festivities. Under no circumstances take any chances whatever with such a fire. Watch carefully for the time when it falls over. A lake shore or a river bed is the logical place for such a fire, never in or near heavy woods.

The Signal Fire.—It is not often that such a fire is needed, but there are many instances on record to show that such fires have not only led wanderers safely back to camp but actually saved human life. Of course, a different sort of fire must be used for signaling at night than is used in the daytime.

For either day or night signal fires, select the highest ground near camp. For night fires, the large Indian fire, kept bright by a continual supply of small dead saplings, is best. If, however, you desire the light to be seen for a great distance, the platform brush fire is best, as it can be made to send a bright column of fire fifty to seventy feet in the air. For a night signal fire, select your fuel. Avoid wet wood or green branches. Ground wood is likely to create too much smoke.

For a day signal fire, just the opposite is desired—a continuous heavy column of black smoke. To secure this effect best, build the log cabin type of fire, filling the pit with green

brush, moss, bark, ferns, grass, and the like. The heavy timbers of the shell will provide enough heat so that the green stuff does not entirely put it out—if intelligently handled, this will make an effective signal of smoke unless there is too much wind or a low barometer.

Fire Facts for Every Boy

Never toss away a burning match.

Never is a strong word, but it says what it means. If burning matches were *never* tossed carelessly away, there would be

many less burned buildings, many less lives lost. The match is a great blessing and a great curse—all on one little stick! It all depends on whose hands it falls into. Make it an absolute law of your life—N–E–V–E–R throw down a match—not even a burnt one or a wet one. Pinch out the glow and either put the stick into your pocket, burn it up in the fire, or stick it into the moist earth where it is harmless.

America has five times the fire loss per capita of any European country. More than two thousand lives are lost and six thousand people injured in the United States every year by fires, many of these the result of carelessly dropped matches. The fire loss in America is more than twenty-five thousand

dollars an hour, year in and year out, night and day. According to Fire Commissioner Robert Adamson, our annual fire loss costs the nation more than it did to build the Panama Canal. That's a sobering thought when we realize that a very large part of it could be eliminated.

Therefore, be very careful of your camp-fire, *always*. A greenhorn camper and a poor sportsman invariably advertise themselves to all who pass by their fires.

Select an open spot for your fire, no matter how inviting it may be in the deeper woods or under a low-hanging tree. Clear the chosen spot clean of needles, old bark, and litter so that

fire cannot spread easily. It is best to confine it, even if only slightly. This is especially important if the wind is blowing, or in dry seasons.

United States Forest Service Men take small boxes of matches (not the safety match), and pour the little wooden box full of melted paraffin, breaking out single matches as needed. This is an inexpensive way, gives absolute protection, and makes matches easy to handle in the woods and on the trail and in winter snows or slush. The commonly called "safety match" is useless in the woods—leave them at home.

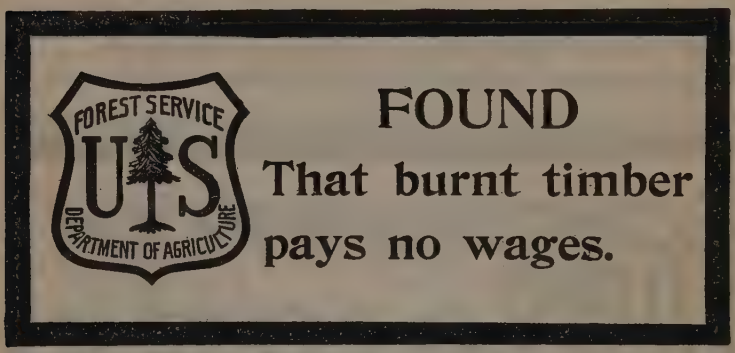
Avoid striking matches promiscuously in the woods after

dark, seeking fuel, a trail, or the like. Equip yourself with a tiny flash light for that purpose, an electric one is best.

Never use kerosene to light fires with, or even open inflammable liquids near a fire. Be careful of cartridges as well as of flash-light powder and papers.

Never fill an oil lantern while lighted.

Never dump hot ashes from your camp-stove on to inflam-



mable material. It is always best to wet them down thoroughly or bury them.

Keep your camp clean of all rubbish and papers and greasy rags. Rubbish, "ignited nobody knows how," is the answer to most fires in camp.

Always stamp out, drown out, or bury your camp-fires before leaving camp and between meals if you are to be away. Take no chances—be certain—wet sods are an excellent thing if free water is inconvenient.

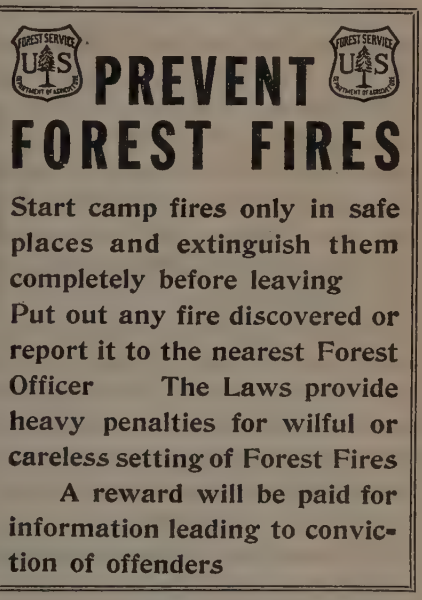
Matches that have been wet or damp can be made to burn by rubbing the sulphur end through the hair. Carry a reserve of matches in a small, tightly corked bottle or else in a waterproof case, but under no circumstances allow yourself to become careless with matches.

Pine needles, pine cones, or birch bark will start a fire very

quickly, are better in fact than paper or shavings. They are very light in weight, consequently some campers carry a small bag of them for starting fires on damp days.

Slivers of fat pine may be readily gotten from stumps and roots. These will burn readily even when wet.

You can avoid much heavy chopping by burning your heavy pieces in two while you build camp or get supper. If large wood is plentiful, feed the ends only of small logs into the flame, pushing them up as occasion demands; however, do not ignore "squaw wood." It may be easily gathered with the hands, and saves much useless chopping. "Standing Squaw Wood," if such is available, is of course always to be preferred over "Down Squaw Wood." Light, dry weathered roots, and the top pieces of piles of driftwood are always excellent fuel.


PREVENT
FOREST FIRES
Start camp fires only in safe places and extinguish them completely before leaving
Put out any fire discovered or report it to the nearest Forest Officer The Laws provide heavy penalties for wilful or careless setting of Forest Fires
A reward will be paid for information leading to conviction of offenders

Never, under any circumstances should you mutilate trees for dry sticks or bark. If you take dead underbranches, break or cut them clean; never tear them off. Numberless beautiful birch trees have been spoiled by careless campers stripping them of bark. Don't be guilty of such poor sportsmanship. Remember, others will follow you into the woods. Conserve their interest in the important particulars of fuel and fire—as well as your own.

Making Fire Under Difficulties

Horace Kephart points out that a fire can be built anywhere with anything if one but knows how. Ingenuity and patience, along with a little "babying," will almost always bring results. If your fire *won't* burn, nine times out of ten it is you rather than the fuel or the weather. Dillon Wallace, writing on this subject, tells the following interesting incident: "Not long ago I went into the woods with five boys whom I had instructed in fire building. They wished to put to a test the things they had learned. For two days and a night a drenching rain had fallen, and it was still raining. Everything was soaked. Because they were to take a test, they left their axes behind, but each carried a sharp jackknife and was provided with two matches. Three of the five got their fires, but it took time and the exercise of that prime virtue possessed by all good woodcraftsmen—patience."

However, getting a fire quickly in wet weather is often a problem. On drizzly days find an old log and give it a half turn, exposing its dry side, and build your fire against it. Select your starting material carefully: make several select fuzz-sticks, split the heart out of a dead tree (a standing one preferably), cut pine slivers from a stump, or gather small dry branches from *standing* trees.

If the weather is excessively windy, build your fire in an old stump or in a shallow pit, or throw up a simple wind break of stone or logs, arranging it, of course, so the smoke will blow away from you.

If wood is scarce, for instance, in the foothills or on the prairie, gather dry cattle chips, arrange them so as to get a good circulation of air, and they make a very creditable fire. They burn better, however, if some bits of wood are mixed with them.*

In sections where firewood is hard to find, keep your eye

* Note again the last portion of Dillon Wallace's excellent article just preceding this one.

open at least an hour before you expect to make camp for a select piece or two of wood which can be carried with you. By cutting such into small kindling, one can do with a surprisingly small quantity for cooking purposes.

Stewart Edward White protects himself against damp day fire difficulties by carrying with him a bit of rubber hose two feet long, on the end of which is fastened a four-inch piece of brass tubing flattened at the end into a fan. By placing the brass end in the fire and gently blowing, the ignition of damp material is greatly hastened. Watch out for sparks in your eyes.

A fire can be started by focusing the sun through your watch crystal or eyeglasses on to a carefully prepared heap of cotton lint scraped from your clothing or made from dry bark (cedar bark is best).

Take the lead from a cartridge, remove most of the wadding, and replace it with a bit of dry cotton rag. Shoot this into a tree or into the air. Very likely the rag will be afire and, if a lint pile has previously been made, a little blowing and nursing of the feeble spark will give you a flame.

However, the seasoned camper will never be without matches, a good knife or a small ax, and with these and his intelligence he is sure to get a fire.

Finally, if you should come upon a carelessly left fire in the wood, *always* feel duty bound to stay long enough to put it out. Never mutilate or destroy a forest fire sign or notice. Make yourself a volunteer deputy fire warden for the sake of all future campers.

A good citizen is the man who constantly and consciously accommodates his conduct to the rights of others and to the interests of his community.—WOODROW WILSON.

FIGHTING FIRE FROM THE SKY *

THE FOREST RANGER BECOMES AN AVIATOR

By ROBERT H. MOULTON

VISITORS to our national parks are sometimes considerably puzzled by the frequency with which airplanes and dirigibles skim overhead. The reason for this activity is not always apparent, now that the war is over.

However, an excellent reason does exist: the flyers are acting as aërial patrols, watching for and reporting any forest fires they discover. Thus, Uncle Sam has found another important use for his aces of the air, right here at home.

Heretofore, the work of patrolling United States forests to locate and fight fires has been entrusted to men on horses, motorcycles, or railroad speeders, and partly to watchers stationed at lookout points. The former travel about from place to place, while the watchers, who are located at advantageous spots, usually on the top of some high mountain-peak, never leave their post, but remain constantly on the lookout for fires.

The observers at lookout stations are provided with all the latest scientific instruments for locating distant objects, and with carefully prepared maps showing the names of all cañons, streams, roads, ranger stations, and the like.

How the Watchers do Their Work

These men have powerful field glasses, and a telephone leads to the nearest ranger station and to the forest supervisor's

* Used by courtesy of the *Popular Science Monthly*.

office. If a fire is discovered, the watcher immediately telephones to headquarters, giving the location of the fire as it is projected on the map of the station; a crew of men is dispatched to fight it.

The efficiency of this system has been increased from year to year, until now it is as up to date and as successful in its own field, as that of a municipal fire department. In fact, the same essential factors for success are employed in the forest work that are universally recognized as necessary for fighting fires in cities: namely, first, detection of the blaze before it has gained headway; and, second, prompt attention.

According to reports compiled by the Forest Service, there are in the United States an average of 28,735 fires a year. The ground covered by these fires amounts to 8,052,945 acres. The estimated damage is $9,875,000 annually.

About 1919, it occurred to officials of the Forestry Bureau to supplement the work of the regular forest rangers by the addition of air scouts, and a few experimental flights were made to determine the value of the airplane and dirigible in this connection. These experiments proved so satisfactory that the Secretary of War issued an order directing the Air Service to co-operate with the Forest Service in the work of forest fire patrol.

Air scouts and bombers who saw service in the Great War are now at work in the forests; and dirigibles—filled with the new non-inflammable helium gas instead of dangerous hydrogen air are also being used in patrolling the forests for fire.

Reports received by the Forestry Bureau show that the airmen experience no difficulty in detecting fires in heavy timber at an elevation of ten thousand feet and even more. From this it will at once be evident what an advantage the air scout enjoys over the watcher in a lookout station. Even when these stations are located on mountain-tops, the range of the observer is more or less limited by reason of the character of the country cut by deep cañons and broken by

mountain-ridges. Furthermore, the area of country that he can see at any time is always the same, whereas the airplane scout, flying swiftly at a much higher altitude, is enabled to cover a wide and ever-changing stretch of country within the space of a few minutes.

The aërial observer has still another advantage, of the greatest importance, over the watcher in the lookout station. The latter, when he has discovered a fire, can do nothing more than telephone its location to the nearest fire guard; he depends upon others to go to the scene and combat it. On the other hand, the air scout, when he has located a blaze, can send in the alarm, and then, swooping down over the spot, drop on it bombs charged with suitable chemicals for extinguishing fires. By this means he is frequently enabled to put out the fire unaided, or to check its growth until the regular fire-fighters have time to reach the place before it has gained any considerable headway. In this connection, a plan that is soon to be tried out proposes transporting fire-fighters in dirigibles from which ladders can be lowered to the ground.

Warnings Flashed by Wireless

The observer in a lookout station locates fires by means of triangulation, reports being telephoned from separate observation points. The air scout locates them by co-ordinates in the same way that gunfire is directed to a particular spot or object—that is, by means of squares drawn on duplicate maps, one being in the possession of each airplane observer and another in the office of the forest supervisor.

The tentative plan is to equip the patrolling airplanes with wireless sets, with which the pilots may flash the first signals of fire. Roads and pathways where a carelessly thrown cigarette may be the cause of thousands of dollars' worth of damage will, of course, be watched particularly.

HIKES AND HIKING

WALK IT OFF *

By THOMAS TINKER

WHEN the cares of earth oppress you,
When the ills of life distress you,
When futilities impress you,
Walk it off!

When the future's grave and graver,
When the past has lost its savor,
When the present finds no favor,
Walk it off!

What's the sport that legs were made for—
What's the purpose trails were laid for?
Well or ill, in debt or paid for,
Walk it off!

THE JOYS OF HIKING

By LESLIE E. EICHELBERGER

HAVE you ever had the friendship of a country road? Have you felt the blood rush through your veins as you swung out with easy stride onto the trail? Maybe the trail was just that country road, or even the sidewalk of a city street, yet the fun was there in the pull of an objective at the end, and in the race-old, primitive joy of freedom to go—somewhere—anywhere—by your own initiative and in your own strength.

The pleasure of hiking is not limited to those who can spend weeks at a time in camp; nor is it reserved for those who live near woods or mountains; neither do you need to postpone it to some crowded vacation week. No, indeed! A Saturday or a Sunday afternoon may do very well. Even two or three hours early in a long summer evening can be filled with interest and recreation and bring physical and mental refreshment to replace the stagnation of overwork or overstudy.

If you are a city dweller and your time is so limited that you can spend only a few hours, pick out some point of possible interest and test for yourself. Locate some park where you can hunt for trees of species new to you, or where you can take a census of the bird residents by a count of their nesting-places. A museum or building of historical interest, or even a manufacturing plant may be a suitable objective. For a snappy evening in the Spring or Fall the "wiener-roast," or beefsteak, or bacon fry proves a welcome variation from the ordinary tramp.

* Reprinted from *Outing*, by permission.

It may be that across the city from where you live there is a settlement, not of foreigners but of "New Americans," and an afternoon there will give you all the sights and sounds—and smells—of a trip abroad! Do you know that fifty feet from the back doors of the Broadway office buildings in our greatest city, you may find yourself in the heart of the Orient? You may travel to Suez or Damascus in thirty minutes between appointments in New York's financial center!

Not long ago in a Rocky Mountain city, I told a group of boys that we would take a trip to Japan and be back before supper! After an hour's walk we came to the place of business of a progressive oriental mercantile company, and spent a most interesting time among queer merchandise—silken shoes, pretty clothes, gongs, hair ornaments, and spices—while lunching on strange candies and rice cakes.

One Summer, while living in a small city, we enjoyed little explorations along roads leading into the country. We continued these until we were familiar with the first two or three miles of road outside the city limits in every direction, and soon found ourselves better informed about the adjacent country than many of the old residents.

Sometimes, perhaps, your pal is busy and you must go alone. These should be times of pleasure and profit just as truly as when you have company. Many things will catch your attention as a solitary hiker that you would pass unnoticed if you were talking to someone. Tiny residents of park or woods will accept one person as a friend where two or more would be fled from as intruders! Some of our greatest men have received strength and pleasure, mentally and physically, from hiking alone. A range of ten miles out from Concord Village satisfied Thoreau throughout life. If you are not good company for yourself, you can hardly expect to be enjoyed by others!

The solitary hiker should avoid going too far into unknown territory. When one's thoughts are on other things,

the route home is not easily remembered, and much worry and weary wandering may result, or a slight accident, such as a twisted ankle, may leave one stranded far from help.

Ten miles a week regularly throughout the year would be a worthy goal. Five hundred miles a year makes an impressive showing! The weekly tramps could be taken "rain or shine," alone or in company. Fair, mild weather makes walking pleasant, but there is also pleasure on cold gray, rainy days. To exert the body, to pit one's strength against the winds, to cause the sluggish blood to stream warm against a nipping cold, and feel the sting of sleet on the face—all these bring joy and satisfaction to the strong, vigorous hiker who loves the out-of-doors.

There is now a League of Walkers, with headquarters in New York City, organized to promote more general interest and participation in "year round" walking.*

Some of my pleasantest memories are of walks with my father—short ones after the evening meal when the twilight shadows were lengthening and the sunset glow lingered low in the west, or longer ones on Saturday or Sunday afternoons when a distant grove was our objective, and we returned loaded with hazelnuts or mandrakes or cowslips in season.

Those are the times when confidences come easy, and a boy's big problems become just little incidents in the light of father's greater experience. Fortunate is the boy whose frequent hiking partner and welcome pal is his dad!

Still better than these short tramps in and about the city, are the longer ones—the real hikes—that are possible when you have a whole day at your disposal. Then you must pay more attention to your footwear and to your clothes. The longer the trip, the more carefully should the companions be chosen and the greater effort given to keeping spirits good

* Information about the League can be had from Dr. George J. Fisher 200 Fifth Ave., New York City, the corresponding secretary of the League.

to the very end! Many people become irritable when overtired, and many a good hike has been spoiled by some discontent cropping out in the last few minutes.

A much larger group may go on a one-day hike than are satisfactory on an overnight trip. I have known as many as forty or fifty people in a single party under the direction of one hike leader, to cover fifteen or eighteen miles in a single day, to the satisfaction of all; but this can only be done when all are seasoned hikers and of about the same strength and ability. Of course, large groups of boys get on nicely if under military discipline, but, ordinarily, this is neither possible nor desirable, so, in general, small groups—not to exceed ten or fifteen—are more pleasurable.

Too often the mistake is made of trying to make an endurance contest out of a hike. The objective should be well within the strength of the weakest of the group, if all are to come through the experience in good shape. There is danger of the optimism and exhilaration of the hikers leading them to attempt too strenuous endeavors, and then comes a strain and excessive fatigue which does not help the hiker to retain a happy memory of the occasion.

One of the advantages of the one-day hike is the minimum of equipment which it requires. Of course, no bedding is necessary, and, as cold lunches will usually suffice, cooking utensils will not be often needed. For a hot drink, try cocoa or canned soup if the weather is cool and the trip at all strenuous.

Never take as much as half the available time to reach your objective. A safe allowance should be made for rest and recreation, or to explore the surroundings a bit before beginning the return trip. Sometimes this may be as much as one-third the entire time, and always enough time should be allowed for leisurely lunch and thorough rest.

The most pretentious hikes, and the ones which require the most care and thought for equipment and management, are the overnight hikes, whether one night or several are to be

PALS OF THE ROAD

HIKING BY A FRIENDLY LAKE

spent en route. Here must be considered the leadership of the party, the fitness and ability of the group, their personal equipment, shoes, blankets, etc., and food for the trip, and last but not least, the routing of the hike so as to find a suitable bivouac at the end of the day's march.

Remember that here, as in every type of hike, the objective must be given careful thought. Plan to hike *somewhere*—but don't be so bound by plans that you will be unable to change the objective en route if occasion arises. Sometimes an air of mystery adds interest to the trip if the destination is kept secret from all but, perhaps, a chosen committee who, with the leader, are making the plans.

For an overnight hike the group should be small. From six to fifteen will allow variation enough to cover most occasions, and all should be carefully chosen so as to be nearly of the same age and ability, though these considerations may vary in proportion to the hike experience of those involved. Remember again that the distance and duration of the trip must be planned to be safely within the range of all, and the group must be kept contented and in condition.

One secret of success lies in keeping the crowd together. The hike leader may find it best to designate a "pacemaker" or "pathfinder" who shall lead the way and set the pace. He should keep the pace down to an easy two or three miles an hour—and no "spurts" permitted. He should also caution the hikers against drinking more than a swallow or two of water at a time while on a hike, and should be on hand to see that this suggestion is followed. Many army officers enforce the rule: "No drinking while on the march." Sometimes a "rearguard" is desirable to urge the laggards on, and to prevent straggling. These officers may be changed at intervals so various ones may have a chance at the places of responsibility.

Enos A. Mills, the noted naturalist and guide of the Rocky Mountain National Park, says "It takes all the pleasure away from a trip when the ones ahead are always yelling 'Hurry

Up!' and the ones in the rear crying 'Wait for me!'" He says that a resourceful leader who is awake to the situation can help keep the group together by being on the lookout for some object of interest, then calling attention to it and describing its characteristics in so low a tone that all will have to crowd close to see and hear.

It is always best, when possible, to make a visit beforehand to the place where you expect to spend the night. Then you can have in mind the best location in regard to wood and water and the best chances of shelter in case of storm. Certainly, you should know about the water-supply before making any point a hike objective. I once went out with a group intending to spend the night near a spring we had discovered the year before. You may imagine our surprise and disappointment when we found the spring nearly dry, and what little water remained, polluted and churned into mud by the tramping of many cattle!

It may sometimes happen that, in spite of your precautions, you will be forced to spend the night in a country that is unknown to anyone in the party. When this occurs you should aim to find the camp-site well before dark—two hours is not too long—for often water or wood is hard to locate, and it is most unsatisfactory to have to rush preparations or "turn in" for the night without food or water. After one experience with a supper of fried eggs and scorched cocoa at midnight in a strange mountain cañon, after having hurriedly prepared shelters by the light of firebrands and smoky lantern, the delay being caused by the breakdown of our equipment wagon, I resolved never again to be caught at dark with my camp yet to make.

Among the personal preparations for the hike, the footgear and care of the feet should receive the greatest attention. Low-heeled, broad-toed shoes, comfortably large without looseness, are best. Thin-soled light shoes are not suitable for hiking. The feet tire more quickly in them, and stone bruises

and blisters are more frequent. Rubber-soled tennis shoes are abominable for hiking and should never be worn for that purpose. High-laced shoes and boots of medium weight will give the feet best protection. They should not be waterproofed unless worn when there is a great deal of moisture, or used frequently for winter hikes in slush or snow. Waterproofing makes shoes heavy and causes the feet to perspire badly—and then, at best, they are never entirely waterproof. Wet feet will not be likely to hurt you if you keep moving

HIKER'S EQUIPMENT

until shoes and socks can be removed and dried. Soft gray or white woolen socks are most satisfactory for hiking. These absorb perspiration, keep the feet cooler than thin cotton socks, and afford padding against bruising and chafing. Some hikers recommend two pairs of light socks, which take out friction on each other, while army men advise soaping the inside of the sock heel so it will slip on the heel instead of chafing the foot. If blisters or chafed spots appear while on the march, they should be cleansed at once and treated with some soothing ointment, such as carbolated vaseline or mentholatum, and then protected from further injury by

adhesive tape and a light pad. It is refreshing at times to bathe the feet in streams along the trail. When this is done, they should be quickly dried and not soaked, or it will make them tender.

You will find hobnails helpful in the pine woods where the needles on the ground make walking difficult, and in the rocky country they are necessary to protect the shoes as well as to secure sure footing. It is best to scatter the nails, putting eight or ten around the edge of the sole, with two or three just in front of and behind the ball of the foot, and five or six in the heel. Placing them too thickly defeats the purpose. It makes the shoes too heavy, causes them to slip worse, and makes a snow or mud "ball" on the soles. Hikers disagree somewhat on the kind to use. Some insist on the small, cone-headed, Hungarian nails, while others prefer the larger ones with the ridged heads. I think either will give good service for the average hiker, though, if all your work is to be done in a certain kind of country, you may wish to find which will suit the conditions best, and use those only. Puttees or the light canvas leggings, without straps under the sole, will keep the trousers from flapping or catching on roots and sticks. The woolen spiral leggings are quite satisfactory, except in warm weather or wet weather, as they then cling closely and dry slowly.

Your kit must be light. No more weight should be carried than is absolutely necessary. Each pound seems to double in weight every mile after the first three or four, no matter how light your pack! I have seen boys (and men, too, for that matter), start on a long hike with articles of equipment dangling from straps and strings from every side, till the hiker looked like a traveling tin shop or moving van! I found it a good plan at first to start ahead of time and make a list of things I thought I'd need on a certain hike. When I finally thought my list was complete, I collected all the articles and placed them on the study table. Right there I started the

elimination process, and, by the time I got down to the real essentials, I found I had crossed off more than half my list.

If the hike is only to include two or three meals, let the cooking utensils be determined by the menu you have planned. A friend of mine once carried a frying-pan on a ten-mile hike, only to discover that he had brought materials to make cocoa, and not a single thing that needed to be fried!

Of course, the season and the locality will largely determine the amount of bedding you will carry, but the manner in which you carry it and the rest of your equipment must be largely a matter of experiment and experience. A blanket-roll is quite satisfactory for a trip with a one-night stay. A poncho or rubber blanket can be rolled outside your bedding, and, if care is taken, all the equipment for a one-night stay can be carried inside the roll. Food and cooking utensils (a small folding camp-kit is the lightest and most compact), should be made into one long slender package, and other necessaries, such as first-aid material, towel, soap, matches, small flash-light, toothbrush and paste, extra jersey, etc., can be rolled into another compact bundle. The poncho should be laid rubber side down, and the blanket or blankets laid on top of it, so folded that the poncho will extend outside them all the way around. Next place one package about six inches from each side of the blanket, and roll lengthwise. Four straps with adjustable catches, instead of buckles, will hold the equipment firmly in place inside the roll. The two lower straps should fasten the ends of the roll together. This may be worn on either shoulder and will do very well for short trips. The large safety pins called blanket pins may be carried in order to improvise a sleeping bag out of the blankets. Those who want more elaborate equipment may buy well-made sleeping bags complete from outing-supply houses. For types of tents and shelters, see the chapter on "Outfits and Equipment" in this volume on page 302. Study the sketches and select one to suit.

A small camera in holster case, and the useful sheath ax, may be worn on the belt at the sides. A bird glass or field glasses and pencil and notebook to keep record of events, will add to the interest of the trip, while compass and map are useful in strange territory. Pocketknife, string, and matches in a waterproof case should always be found in convenient pockets.

Packsacks, knapsacks, and rucksacks may be purchased in many styles at various prices. Any good sporting-goods house can suggest one to meet your needs, if you are doing enough hiking to warrant the expense of one. A heavier burden can be carried with less fatigue on the back than in any other way, so, if you plan to hike much, you will do well to give some attention to getting a good pack. Even on short trips, a small knapsack, proves very convenient for keeping all your traps together. Avoid having weights or straps across the chest, as these interfere with free breathing. This is one disadvantage of the blanket-roll. Avoid a shifting load. Have it firmly strapped where it will carry most easily. Do not have the weight too high on the shoulders, as it makes you top-heavy and tires you too early in the trip, especially if your trail lies up a mountain-side. If your pack is too low on the back, it interferes with free hip action and also tends to throw you off balance. A headstrap, or "tumpline," even if only improvised from a bandanna handkerchief, will ease tired shoulders in a remarkable way.

The whole question of the distribution of weight is of supreme importance on a wilderness or mountain tramp. It is surprising how much weight can be carried a great distance, if only carried sanely. Too often all the weight is crowded into a bulky package on the back. The result is that the back and shoulders tire and need rest long before the balance of the body is fatigued. Let all the body possible bear the weight. Let all the muscles do their share in carrying, and the result will be astonishing.

In packing your outfit, plan carefully to have things you

will be likely to need first, in the most accessible part of your pack. Have similar articles grouped—the food together, the first-aid materials together, nature study articles together—so you will not have to hunt clear through the lot for each separate article.

Real care should be taken in planning the food for the trip. Nothing weakens the body, destroys courage, and causes real anguish quicker than a bad spell of acute indigestion when on a hike. When that sickening sensation begins to come in the pit of the stomach, it is too late to think of sensible food and balanced rations. There is always more danger of overeating than of eating too little. Some of the most experienced mountain climbers carry nothing but sweet chocolate or a few seedless raisins for the noonday lunch on a strenuous trip, but this is no reason for the amateur thinking he can thrive on candy and salted peanuts.

On a hike covering several meals, it is most satisfactory to take a prepared lunch for the first one. Plain meat or egg sandwiches, with the eggs fried hard so they will carry well, and a little fruit, will be sufficient. Oranges are the best for a hike, though sometimes it is a welcome change to carry a tiny can of grated pineapple to open for refreshment and thirst quenching at the rest period. I have found this very satisfactory when on long trips away from water, as it does away with carrying a canteen, except in unusual cases. Bananas are hard to digest, so are no good for the hiker. Cocoa is better than coffee for most people. It is not only mildly stimulative, but contains much real food value. Bacon, ham, and beefsteak can be nicely cooked on a green forked stick over the coals if you do not wish to be burdened with a frying-pan; and the bacon and ham at least can be kept nicely for several days if carried in oiled paper. It should be sliced before starting on the hike and should be wrapped carefully to protect the other contents of the pack. Canned soup is most nourishing and refreshing, and easy to carry. Canned baked beans are

always popular, but should be reheated and then eaten sparingly. Canned salmon, salmon on toast, fried potatoes, fish that you can catch en route—these all can be easily prepared in the utensils that are included in the compact cooking kits that can be purchased almost anywhere. Right here I must add that the best baked ham I have ever eaten, while hiking, was cooked in an aluminum reflector oven. These reflector ovens can be folded flat, as small as a checkerboard, and are unbeatable for biscuits or baked meats. They are thoroughly practical for long, go-light hikes.

Some experienced men pack the food for each meal separately, either in a cloth bag like a salt sack, or in a cardboard candy box which can be carried easily in pack or bed roll and thrown away when empty. One friend of mine carries his food in small tin boxes—similar to Nabisco boxes—in which he carries home his specimens of flowers and moss and fern.

The Government issues to soldiers a condensed emergency ration, well balanced and easily prepared. Similarly, many mountain climbers in the West plan a hiking ration that will include the maximum food value for the minimum of weight and space. Here is a sample menu suggested by an old hiker as one scientifically balanced and thoroughly tried out:

One square inch Swiss cheese
Two small slices dried beef
Two small slices bacon
One hard-tack or Pilot bread
Four macaroons
Four caramels
One tablespoonful seedless raisins
Four disks Swiss chocolate
Four dried prunes
One tablespoonful shelled nuts
Coffee or cocoa, with canned or powdered cream for each meal in separate sack from the food.

This is enough for one meal. It can be packed in a one-pound candy box and as many boxes carried as there are meals

to be taken on the hike. Malted milk tablets make a good auxiliary ration, and the dehydrated or powdered milk, when mixed with water, makes a satisfactory milk for cooking.

If your group is not accustomed to hiking, it may be well to issue lists in advance, telling just what each one is to bring. Then, you may find it best to have someone prepare or supervise the cooking for the less experienced ones. On extensive trips, such as a week's hike with pack horses, it is advisable to hire a professional cook.

Wear old clothing for hiking. Nothing is more practical. In most any weather a light woolen undershirt or athletic jersey will give best protection. It absorbs perspiration and prevents chills. A flannel shirt is best even in warm weather; and, except in the thick underbrush, a sweater is more comfortable than a coat. A broad-brimmed service hat, such as the scout hat, is sensible, as it gives plenty of air space between head and hat crown, while the brim protects the face from sun and snapping branches.

Remember always that hiking and camping are "Team Games"—the good of one is the good of all. Comradeship and good spirits make the atmosphere for pleasant hikes. The idea should always be to enjoy the trip rather than to exhibit your strength and endurance. One writer says, "The overnight hike should be a camping experience, and not an attempt to cover many miles in record time." According to the "Handbook for Scout-masters," "The overnight hike is, in effect, a short-time camp and requires practically the same preparation as a camp." So, consider well, make careful plans, and, if you begin with judgment, your first hike will lead to many more, each more pleasant than the last, and your hiking comradeship will ripen into lifelong friendships.

Hints for Hikers

The old woodsman says, "Never walk over anything you can walk around, and never step on anything you can step over."

When sleeping on the ground, hollow out a "hip-hole" for your hips and you will be saved much stiffness.

An army rule forbids drinking while on a hike. Rinse your mouth occasionally, but swallow little or no water.

When you rest, throw off pack and relax completely.

Brief and frequent rests are better than longer ones. Long rests make one stiff.

Use iodine for cuts and broken blisters, but *never* wet a bandage with it or wrap a cloth around it, as it will cause a bad burn.

Keep arms, shoulders, and neck well protected. Sunburns may be as painful as fire burns and are likely to become infected. Only the "Greenhorn" or "Tenderfoot" is proud of sun blisters.

Take an extra pair of socks.

Build fires only in the open and on mineral earth—never on a bed of dead leaves and grass. Be sure your fire is put out with water or completely covered with sand with no twigs or leaves in it. These may smoulder for hours, then be fanned into flame. Carry matches in waterproof match box.

Do not cut branches, nor strip bark from living trees.

If camping on private land, get permission before building fires.

The cross-country trip is more interesting than traveled roads.

When you get wet, keep moving until you can change into dry clothes, or dry your wet ones while enjoying a good rub-down.

If feet get soaked, take off your socks and wring them as dry as possible; walking in them till they dry will make your feet tender.

Perspiration-soaked clothes are as bad as rain-soaked garments.

Never hike in new shoes.

The value of a hike lies in doing the things that are out of the ordinary—instead of carrying baseball gloves, take bird charts or flower books.

Do you see individuality and character in trees? Or do they all "look alike" to you? Birds have "personality" too. Did you ever look for it?

Boil water before drinking it, unless you are sure it is safe; or treat with Squibb's "Halazone" tablets, which you can get at any drug store.

Water is not necessarily pure and good just because it is clear and sparkling.

Respect the right and property of farmers through whose land you pass.

Never cross a grain field.

Do not frighten or molest either domestic animals or the little wild friends whose trail you cross. Be friendly and you will make friends.

To cross a stream on a log, fix your eyes on the opposite shore and walk straight across. If you should fall, you will fall with arm or leg across the log. Never face up or downstream and "sidle" across. It is just courting a fall.

If the stream is deep and dangerous, don't be ashamed to straddle the log and "hitch" across. A little pride is not worth a dangerous fall.

When going on a hike in the country, take a car to the edge of town. Pavements are wearing on muscles and nerves.

Do not forget adhesive tape, small roll of gauze, and screw-top bottle of iodine or other antiseptic.

A bandanna handkerchief has many uses—it makes a sling for a sprained wrist and a pack-sack for roots and flowers.

Have a bit of your favorite "fly dope" in your kit.

Don't travel at night unless compelled to, and then only on a road and with a lantern.

Stay with the crowd—a group seldom gets lost.

Watch out for loose stones. A wrenched ankle makes a poor traveling companion.

A cornshock or cordwood sticks can be made into a most acceptable shelter.

If you walk correctly, you will not easily tire.

To walk correctly, point the toes straight ahead and swing the legs freely from the hips. One who knows how to walk, never lacks a conveyance.

Rest awhile after a hearty meal.

If you clear away ashes where your fire has been, you will have a warm, dry spot for your bed in any weather.

Never build a large fire for warmth or cooking. A small one built between logs placed in the direction of the draft, will let you get closer to it and give you more comfort. Embers are better than a blaze to cook over.

Winter hikes will open a new field of enjoyment. Protect yourself against the weather and you will find old scenes have a new charm in a garment of snow. Skis or snowshoes are worth mastering.

Remember that "a friend is a fellow you would go camping with *twice*," and resolve that you will be a true sportsman—taking mishaps cheerfully, willing to do your full share of the work, and secure in the knowledge that real worth can most quickly and surely be found away from the veneer of civilization, surrounded by Nature's creatures, out where one is really a part of "God's Great Out of Doors."

The little cares that fretted me,
I lost them yesterday,
Among the fields, above the sea,
Among the winds at play;
Among the lowing of the herds,
The rustling of the trees,
Among the singing of the birds,
The humming of the bees.

WHITTLING AND AXMANSHIP

The Yankee boy, before he's sent to school,
Well knows the mysteries of that magic tool,
The pocket-knife. To that his wistful eye
Turns while he hears his mother's lullaby;
His hoarded cents he gladly gives to get it,
Then leaves no stone unturned till he can whet it;
And in the education of the lad
No little part that implement hath had.
His pocket-knife to the young whittler brings
A growing knowledge of material things.

—JOHN PIERPONT.

THE AX AND THE KNIFE

By PHILIP D. FAGANS

IN THE early days of American life the ax and the knife were the two indispensable tools of the settlers. With the ax they cleared the land, felled trees, fitted and squared logs for their cabins, made floors, wooden hinges for the doors, pegs to hang their clothes on, rough-hewn tables, benches, and all the things that necessity and comfort later demanded.

With the knife they made spoons, brooms, rakes and bowls; trimmed the skins of the animals they caught, and made the smaller things needed in the cabin and around it.

One might say that the ax and the knife made America, for out of these two tools grew the many others. Through learning to use these two tools our forefathers developed self-reliance and ability to take care of themselves under all circumstances.

In those days the average man whittled as he talked, just as so many women during the Great War knitted as they carried on their conversation or listened to a lecture or a musicale. In fact, among the bills paid in the early days of some of the colonial assemblies there were included charges for wood for whittling.

Chopping wood, too, was a form of recreation with President Lincoln and our own Roosevelt, not to mention Washington's and Grant's expert ability with the ax.

Whittling

Some time ago a friend of mine was in the wilderness in a rain which had been pouring steadily for days. The only

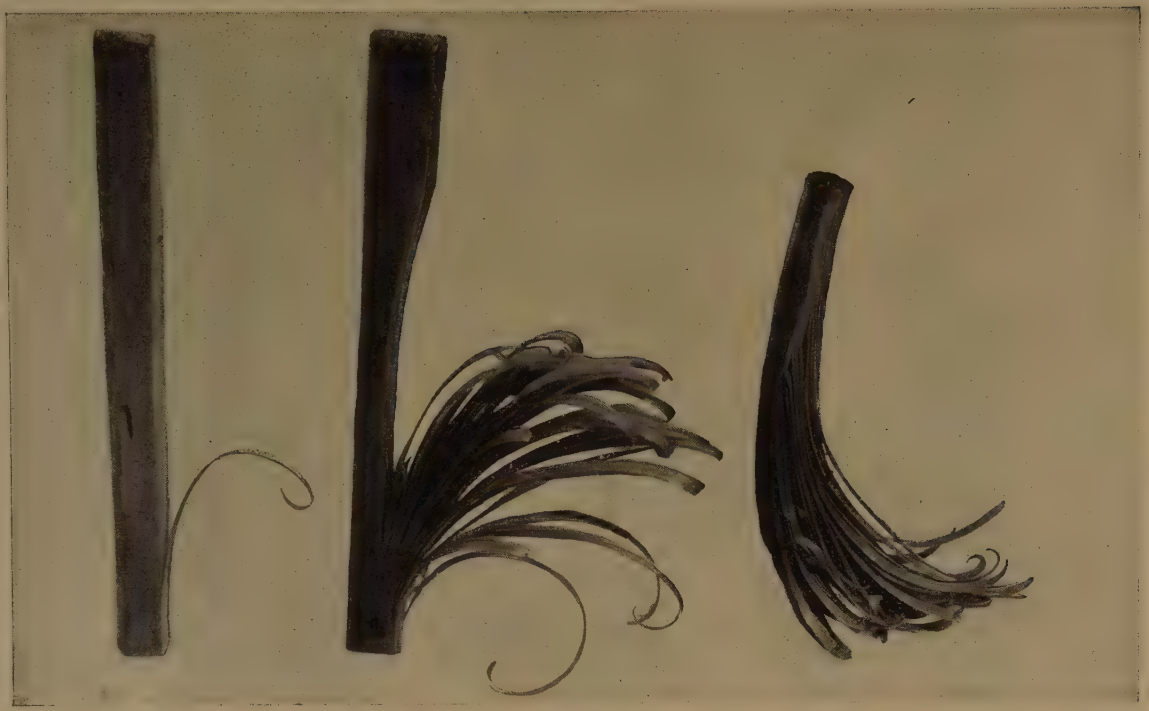
tool he had was a jackknife, yet in a short time he easily built his fire. From a little copper wire, a condensed milk can, and a piece of white birch whittled into a handle he made himself a fine drinking-cup, dishes of bark, a spoon, and several other needed articles.

Whittling, then, is not only good fun but good to know in emergencies. And, if you really want to please your younger friends, try making a whistle, a wooden chain, a wooden soldier, or any other toy that can be whittled from a soft piece of white pine with a sharp knife and a good imagination. (See detailed directions in the following article.)

What Kind of a Knife?

Shall it be a long blade with a fancy handle, fit to kill a bear or a buffalo, or shall it be one fastened with a ring to a long chain and containing a can opener, bottle opener, leather punch, screw-driver, and knife? These are both all right in their way, but for general, steady use in all sorts of places and circumstances, we will buy a good, plain, solid knife that fits well in the hand and that will not cause blisters when we use it for a long stretch of time. I had a knife I liked very much, but once, when I tried for a Woodcraft honor of making fifteen fires of wildwood material with fifteen matches, all in different places, on a wet day, I found blisters forming in my hand. I tied a handkerchief around it and proceeded. When I bought a new knife I got a handle large enough and shaped to fit the hand. This knife will have one good-sized blade and a smaller blade, both strong and solid and with a strong spring.

Look up someone who will know how to properly sharpen it for you and tell you how to keep it sharp. Own a small carborundum stone, pocket size, and as the edge of your knife gets dull, learn to sharpen it. Look out for a "tin edge" and learn how to fix it. Make a practice of keeping your knife sharp at all times. It pays; then such an implement is a never-ending source of joy, not to mention its usefulness.



THE WAY TO MAKE A FUSS-STICK

CAMP SPOONS MADE WITH A JACKKNIFE

How Shall We Learn to Whittle?

Somehow or other, when a boy gets a sharp knife in his hands he wants to cut the first thing handy. So, the first bit of advice is "Don't cut the furniture, the railing on the front porch, or anything like that." It is very unpopular. Don't cut your finger to start with, or it will be good argument why you shouldn't be allowed to whittle. Above all things, don't whittle where your mother will have to come around and clean up after you, and when it comes to carving your initials all over the "landscape," that is sure evidence of a very green "greenhorn." Real woodcrafters *never* do it!

Pick out some particular thing you want to make. Try your hand at a whistle of basswood or willow, in the Spring, or a water squirter of elder, or just take a stick and see how evenly and straight you can cut it.

Making a "Fuzz Stick"

Take a dry piece of soft wood like white pine, say twelve or eighteen inches long and about an inch thick. Take your knife and shave a little sliver as long as you can make it comfortably, taking care not to cut it off the stick. Then cut another, and another, making them all very thin and feathery. (See the illustration.) After you have shaved several you will not have to exercise such great care. Keep on cutting until you have the whole stick cut away. If you can do it without losing one sliver, you are a good whittler. Then turn the fuzz stick upside down out on some vacant lot, light it with a match, and see how easy it would be to make a fire even on a wet day if you had two or three fuzz sticks like the ones you have just made.

Try making a model log cabin, a paper cutter, a picture frame of sticks, or anything that can be made with a knife for practice, but as you whittle keep these rules in mind:

1. Always expect the knife to slip, so hold it in such a way

that it cannot cut your other hand or any other part of you, for that matter. Don't hold the knife so that a slip means a cut. It is possible to seriously injure yourself with a sharp knife if you grow careless.

2. Cut with a sliding stroke. Watch your father when he shaves, or your mother when she cuts bread—they use a sliding stroke rather than a straight push. Wood is not cheese to be cut by merely pushing down. Its fibers are hard and tough. There is a hard and an easy way to whittle—learn the easy way at the beginning.

Don'ts in Whittling

Don't carry an open knife.

Don't cut nails.

Don't cut hemlock, balsam, or other knots. They are likely to chip your blade.

Don't put your knife in the fire—it will ruin its temper.

Don't use your knife as a screw-driver, a crowbar, or a hammer, but take as good care of it as you would of your best watch.

Remember

A good, sharp jackknife is the most useful tool a boy can own. Unless I have mine in my pocket when I start for the office, I feel only partly dressed and all day find myself reaching for it. Treat your knife right. Keep it sharp and it will serve you well.

As I was lunching one day in a Times Square restaurant looking out over Broadway and Forty-third Street, New York City, with the usual crowds of people hurrying up and down, I picked up the daily paper and read

"TRADITIONS PASS WITH THE JACKKNIFE"

"Where Are the Barlows of Yesteryear?
City Boys Know Them Not."

How many city boys own a jackknife? Back in the country they all do, but in the cities it seems that most of them chew their school lead pencils when they have to be sharpened or use their mother's sewing scissors. Apparently, not even their fathers carry a veritable pocket-knife, as a general rule. Yet, it is only a few years—a generation at the most—since the jackknife was a great American institution.

Owning and carrying one was the boys first symbol that he had reached the age at which he could be trusted with the first of the perquisites of his sex—a knife, the primal tool for the carving out of his career.

The old jackknife with a man's blade is as different from the city knife of to-day as the soldier's saber was from the courtier's rapier of a bygone age. It was made for work, and its work compassed the full scope of that American pioneer era which brought it into being and gave it vogue.

In the days before life became complicated and so multitudinously served, any normal American was able at a moment's notice to produce a jackknife and whittle, from a shingle or a piece of board, anything that might be required—from a toothpick to a doll's cradle. A man would no more think of leaving home in the morning without his jackknife than he would of adventuring fate without his galluses. The mechanic used his knife constantly, the farmer would have been helpless without it.

Aside from its manifold utilitarian purposes, the American jackknife was probably one of the greatest political factors of its age. As a producer and concentrator of thought, it seemed in the hands of our fathers to be a veritable fountain of wisdom, history, and philosophy. Armed with a jackknife, a shingle, a copy of the weekly paper, and a cracker-box, the progenitors of that lowly class which existed before the proletariat came, were able to settle most satisfactorily all of the complex political and social problems of the day.

There seems to have been two classes of the old-fashioned

American whittlers—those who whittled to aid their thought and those who thought to aid their whittling. While it is true that the second class turned out some excellent wood engravers and artistic decorators of furniture, the first class seems to have been the product which left the more lasting effect upon life. The man who whittled while he thought left nothing of his shingle save a clutter of shavings, but he usually had a well-rounded idea in his head when he had finished. The closing of his jackknife usually meant that the argument was ended, to his satisfaction at least.

WHITTLING A CHAIN AND RATTLE*

By A. NEELY HALL

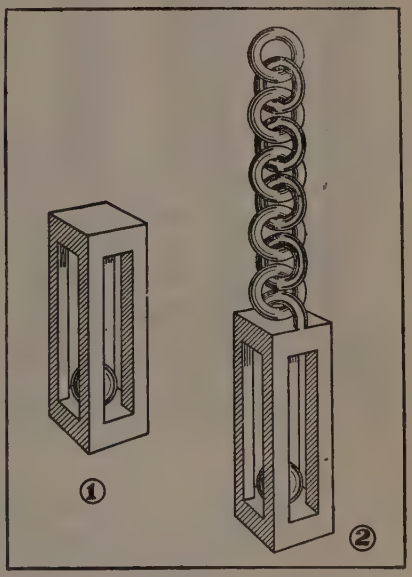
A PIECE of straight-grained soft pine, free from knots and other defects, a sharp knife, and carefulness in cutting, are the three requisites for making the rattle shown in Fig. 1, and the chain-and-rattle shown in Fig. 2. When you have completed either one, you will have an interesting model which will be proof of how good a workman you are. Maybe you will be unsuccessful in the first attempt at making a rattle, which I would advise you to tackle before the combined chain-and-rattle model. But don't give up. You must learn the art of whittling through practice. Plane up another block and make a fresh start.

Figure 3 shows the block for the chain-and-rattle problem. The lower portion can be used for laying out the block for the rattle problem. Get a piece of soft pine, 1¾ inches square, from a carpenter. True this up if it is not exactly square and of correct dimensions. Then with a try-square, if you have one—a ruler if not—lay off the spaces between the horizontal lines, upon each face of the block, and square the lines across

*© by A. Neely Hall.

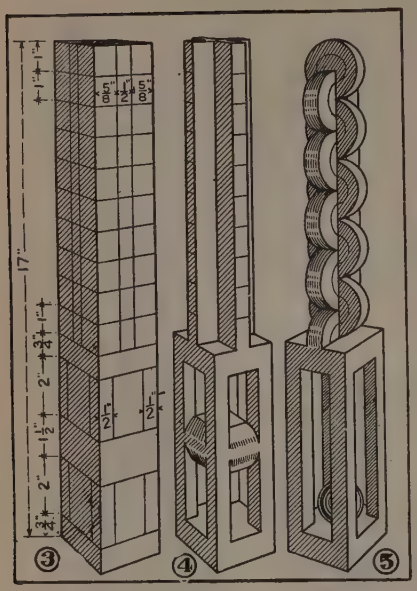
each face. With the horizontal lines drawn lay off the measurements for the vertical lines, upon each face, and draw them.

After the block has been marked out, the first step in whittling is the cutting away of the wood above and below the ball. Figure 4 shows the block after this cutting has been done. In cutting away the wood, do not attempt to remove too much at a time. Cut in from each face. Cut across the grain at each end of the piece to be removed, then carefully cut out the wood between the cuts.



When you have completed this step, separate the ball block from the frame, by cutting away the square corners a little at a time until the block has assumed a round form. Continue the rounding process until a perfect ball has been produced. This ball must not be cut too small or it will fall out of the frame. When the cutting has been completed, go over the work and smooth off rough places with your knife.

In cutting the chain of the chain-and-rattle model, the first step is to cut away the four corners of the block as shown in Figure 4. Then, starting at the top, cut off the corners, and notch the block on each face at every other ruled division line, cutting these notches deeper and deeper, and rounding the portions between them, until the links have been formed. Draw circles in the centers of the links, and carve out the wood inside of the circles. Separating the links requires careful



cutting. Cut slowly and always cut the cross way of the grain first, then you will have little difficulty in keeping from splitting the wood. Keep a keen edge upon your knife, rubbing it up from time to time while working. Having separated the links, round off their edges like the links of a metal chain. Then sandpaper them.

When you have completed the whittling and sandpapering, give the model a coat of shellac or wax.

THE AX AND THE AX-MAN

By PHILIP D. FAGANS

SOMEHOW or other, the ax-man has always been a sort of hero. Tall, strong, broad-shouldered, light-footed, keen-eyed, he takes his place, and his ax swings sharp and glittering through the air, striking the tree exactly and biting deeply into its wood. And every chop goes straight, one following the other, large chips dropping after each blow, till the tree quivers, shakes, begins to lean, then, gathering increasing speed, with a swish and a roaring crash, falls to the earth. A great tree which took a hundred years to grow has been brought low in a few minutes by a small tool skillfully handled.

In all the crafts of the outdoorsman there is nothing that

can be developed into an art more readily than handling the ax. Kephart says that if one is to become a real ax-man, he must begin to handle the tool at eight and, I suppose, literally grow up with the ax in his hands. Lincoln did, Grant did, as did many other Americans, so that, when they became young men, they could not only fell a tree so accurately as to drive a given stake as the tree came down, but from it could split clapboards, dress timbers, or shave shingles, as the case might be.

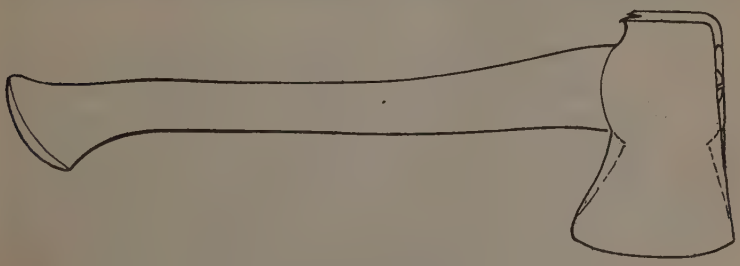
You and I, perhaps, live in the city, and the ax may not mean to us what it did to them. But, if we want to have some good fun, it will be worth while to learn how to properly handle an ax.

What Kind of an Ax?

What is the best kind of an ax? Since we are making a *beginning* in axmanship, there will be only two types that we will need to consider.

One is the short-handled camp ax or hatchet which is used with one hand, the other is the regular long-handled ax which requires two hands.

The short-handled camp ax is on sale in most of the hardware stores of the land. While there are many makes, most of them are good. If you really want to learn how to chop, you had better own your own ax. This will enable you to have it



A GOOD STYLE OF AX

when you want it. You can be sure it is treated properly and you can also be sure then that you won't spoil another fellow's ax. As you use it, little by little you will pick up the art of handling the ax until it becomes almost a part of you, going as you think, and working as you plan. By experience you will learn how to grind it and keep it sharp. And as you become increasingly proficient, you will discover certain little kinks and develop particular ideas of your own.

The camp ax illustrated is of Damascus steel, with a screw in the handle at the head to insure the head staying on tightly. The other end of the handle is enlarged a little to prevent the ax from slipping from your hand—something that frequently happens with the beginner when the handle is straight and the end smooth. The ax is nicely balanced, that is, the proportion of weight between the ax head and handle is good.

The regular two-handed ax is the standard one for general use. While the double-bitted ax is fine for the expert woodsman, it is a two-edged tool, dangerous in the extreme for any one else. What we want is a regular ax with a strong handle with just a little spring in it. The ax should be heavy enough to get the benefit of its weight and yet light enough to handle comfortably. For that reason the weight must necessarily depend upon the user.

If you can own your own ax, this is ideal. Maybe to start with, you'll use the family ax, in which case your father will have to be considered and permission secured, and very likely it will need to be ground.

Having secured either your own ax or permission to use another's, what's next? You have heard of the man who was all dressed up but had no place to go? Quite frequently this happens when a boy gets hold of an ax. Consequently, he is very likely to hack at every thing in sight, perhaps ruin trees, fences, and lots of valuable material or objects, simply because he has an ax in his hands and must use it. Such actions are certain to brand any boy as a "greenhorn."

Don't hack. Don't blaze or chop trees that are not to be cut down. Don't do anything with the ax that will harm, or scar, or destroy property. When a "goop" gets loose with an ax, you can tell for years afterward what happened. Don't be a "goop."

Do something definite. Try to make something, using only an ax. If you are cutting camp wood, try to improve your axmanship. See how accurately you can hit, or how big chips you can make with how few strokes, or how smooth an end you can leave after your chopping. If you cut stakes, do it in a workman-like way, making the top end square and the pointed end foursided.

Never swing your ax until you are sure you have a free swing. Before starting, swing the ax carefully at full arm's length to see whether there are any twigs or branches to interfere with you as you chop. Just a slight touch is exceedingly dangerous. It may deflect the blow of the ax and cause serious damage to yourself or an innocent bystander.

Get a solid footing. Don't chop at a log or stick that is likely to slip or move as the ax is in the air.

Hold your ax securely. When using the two-handed ax, the hand away from the end slips up and down the handle as you chop, but the other hand makes sure that the ax doesn't fly out of your hands.

Never take any chances with an ax when the head is loose, particularly when other people are near you. There is no more dangerous missile than an ax thrown from an ax handle. Don't procrastinate; stop and fix it. Drive in a good hardwood wedge. Learn how to do it by doing it.

Always strike the wood at an angle. You will note that when striking the wood at right angles to the grain, the ax does not cut very much, and that there is a backward bounce due to the resistance of the wood. If you strike the grain diagonally, the ax will cut deeply and there will be no backward bounce. See Figure 1.

Look out for a glancing blow—it may send the ax where you do not intend it to go and cut your foot or leg. Two of the best woodsmen I ever knew cut themselves in one Winter, one his leg and the other his foot, simply because of a blow which for one reason or another didn't go quite right. Therefore, anticipate just such a happening and don't let it happen to you.

If you are cutting small wood, use either a block or another log to chop or split upon.

Keep your ax out of the dirt. Look out for stones. Don't cut on the ground, even if you see no stones. Dirt isn't particularly good for sharp edges, and where there is dirt there are stones.

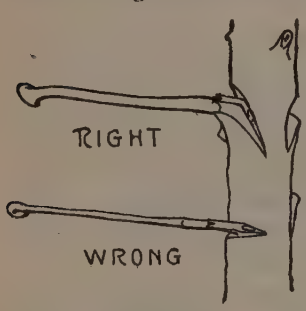


FIGURE 1

Avoid all knots if you can. Above all things, don't put a sharp ax into a hemlock or balsam knot—they are particularly hard and are almost certain to ruin your ax.

If you use the ax in very bitter weather, it may be worth remembering that some woodsmen warm the blade with their mittened hands before starting to chop, so as not to needlessly chip it. Chopping always keeps an ax warm.

When you are not using your ax, sink the blade into a stump. Don't leave the ax just lying around. You may lose it, break its helve, or someone may cut himself badly by stepping or falling over its sharp edge. See Figure 2.

Remember that the chief and only purpose of an ax is to cut wood. In order to do this, it must be sharp. The average camp ax reminds one of the old stone hatchet days. It would wear the wood away if you hit hard enough and often enough, but do very little effective cutting. *Keep your ax sharp.*

I have heard Dillon Wallace, the Labrador explorer, say

that the Labrador people always carry a small file with which to sharpen their axes. I know that a small file occupies very little room and is very effective in putting a good edge on an ax-blade. When these files wear out they may be heated, tempered, and made into crooked knives which will make most anything in an expert whittler's hands. Buy yourself a small flat file and keep your ax in shape with it. Occasionally, of course, you will want to use the grindstone or carborundum. If you use the latter, don't do such a fast job that you heat the blade and ruin its temper. Only experience can teach you how to properly grind your ax.

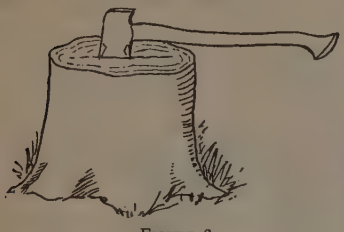


FIGURE 2

Don't pound stone or metal with your ax. Never drive another ax into a log as a wedge. Stop and cut wedges if you have no metal ones.

Don't throw your ax—it may hit a stone, break the handle, or hit someone. Always hand an ax to another party handle first. See Figure 3.

In short, remember that a good ax is a fine tool to be handled with the greatest of respect.

FIGURE 3

How to Cut a Log

If you are cutting a large log that cannot be turned over on the ground, stand on the log and cut halfway through on one side and then on

the other. You stand with your feet wide apart and chop in between your legs. The notch should be half as wide as the log is thick. You may have seen a chopping contest in some circus and envied the ease with which the large chips

FIGURE 4A

FIGURE 4B

flew out. The secret of course is hitting the right spot in the right way. The notch should run straight up and down on each side, as shown in Figures 4A and 4B. Ordinarily, in cutting small logs you cut a notch on one side and then turn it over and cut the other notch. In such cases, of course, you stand on the ground.

Beginners frequently do not make their notches wide enough, and they cut the notch too slantingly and then have to chop over it again. Experiment with this thought in mind. Never cut from more than two sides—you are not a beaver.

TRIMMING LIMBS

If you are trimming limbs from a branch or from a tree that is down, start from the butt end and chop toward the tip. The wood will cut easier and tear less as the branch comes off.

If the limb is on a growing tree, it is particularly important

that you do not rip the bark underneath when the branch is cut. Hit a blow underneath near the trunk, then chop from above.

How to Fell a Tree

The first bit of advice I would give is "Don't." That is, don't cut down a tree simply because you have an ax in your hand. Make sure that it should be cut down. Remember that in a few minutes you can destroy a tree which only many years can grow. If we all lived hundreds of miles in the deep woods, it might not make so much difference. But our fathers and grandfathers cut trees assuming that there would always be an inexhaustible supply. They left high stumps, used only part of the lumber, were careless of fires, and, as a result,

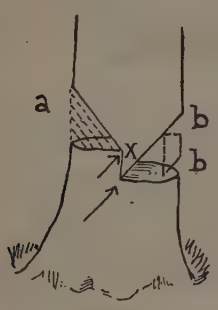


Figure 5

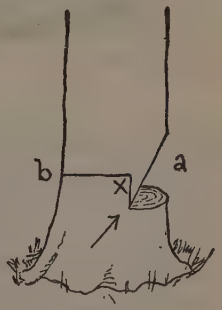


Figure 6

lumber is getting very scarce and expensive. The price of newspapers, magazines, and books is high because billions of trees have been cut down and used up without new trees being planted to replace them.

It is so easy for a boy to go out a few yards from camp, to see a tree that he thinks is "no good," and with a few strokes of his ax cut it down, when it should have been allowed to grow until it became a big tree and of some real use.

Since we live in and near civilization, the first rule then, in cutting down a tree, is to get the specific permission of the

owner to cut down that particular tree. If you are off camping in the woods, still remember that the trees have owners and that it is to the advantage of all of us to conserve them to the utmost. Generally speaking, cut only dead or insect-infected trees.

Assuming that there is a particular tree to be cut down and that the owner has said you might do it, remember that four

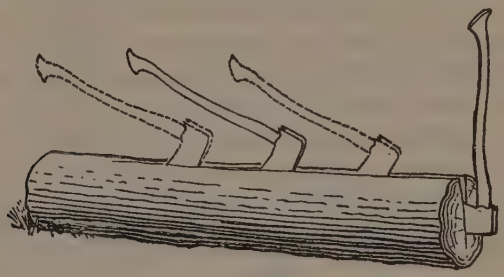


FIGURE 7

things will determine the way the tree will fall: first, the way the tree leans; second, the way the tree is balanced (it will likely fall to the side which has the most and longest limbs); third, the way the wind is blowing; fourth, you will want the tree to fall where it will not catch in other trees and where it can be easily gotten at to cut up.

Cut a notch (a) on the side *opposite* to the direction in which you wish the tree to fall. See Figure 5. Don't cut the stump too high so as to waste lumber. Make a notch on the other side lower than a at b. This will form a hinge at x and prevent the tree from kicking backward and killing someone when it falls. Begin chopping at the notch, b–b, making the bottom side of the notch as straight as possible, especially in the case of a soft-wood tree. When you have cut this notch half way through, return to (a) notch and deepen it the necessary amount. Sometimes the tree will need a bit of help to start it in the right direction. Do this very cautiously. Large

trees nowadays, however, are usually cut down by the saw instead of the ax.

Several Summers ago, while at a boys' camp in the Laurentian Mountains, in Canada, we were building a "council ring." As we needed some seats, I got hold of a French Canadian and we went out to cut down three good-sized balsam fir trees. A notch was put in each tree at a, as in Figure 6, on the side to which it was to fall. We began sawing on the opposite side at b, above a, so as to form a hinge at x again. As the saw bit into the tree and it began to bind, we drove a wedge in the crack at b, back of the saw. In a very few minutes we had the three trees down safely and the trunks trimmed of limbs.

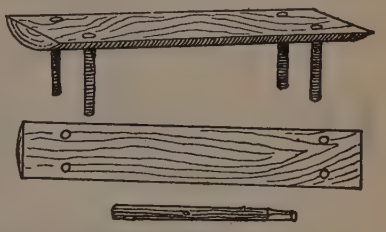


FIGURE 8

The next thing was to split the logs which we had sawed into six or seven foot sections. One ax was sunk into the end of the log in a likely place, the other on the top toward the end. The second ax loosened the end one, which was taken out and sunk about a foot back of the other. Every time an ax was put into the log it loosened the one in front. A very few strokes split the log in half, and in an incredibly short time the entire job was completed and we had the necessary building material. See Figure 7.

An auger was used to bore two holes at each end, on the under side, of course, and into these holes stakes were driven for legs. Very soon we had our completed seats for the "council ring," as shown in Figure 8.

HAVE YOU? *

By HARRY DEAN

HAVE you ever built a camp-fire at the closing of a day?
Have you sat and watched the embers glowing red?
With your scanty supper finished and the things all cleared away,
Have you sat and dreamed and thought about your bed?
Of the bed you left behind you in the dwelling-place of man,
In the much o'er-furnished room you knew of yore;
E're you sought the silent places where a fellow learns he can
Do a lot of things he never did before.

Have you ever spread a blanket down beneath the star-strewn skies?
Rolled yourself within its cozy folds to sleep,
At the base of mighty mountains with their peaks that rise and rise?
Have you known the age-old silence that they keep?
Have you seen the red sun climbing up the eastern slope?
Then know
You will ne'er forget those rugged, happy days.
What! You've never known the glory of the new-born day?
Then go—
It's a road that's hard to travel—but it pays.

* Reprinted from *Outing*, by permission.

CABINS, SHELTERS, AND A COUNCIL RING

Paling of stars in the eastern sky,
Stirring of birds in the trees,
Uneasy movement where low mists lie,
Wood-smoke scent on the breeze.

Glimpses of khaki in forest aisles,
Flashes of brown in the vales,
Chirr of a blackbird where water smiles,
Padding of feet on the trails.

Drifting of fleecy clouds overhead,
Dallying breezes that pass,
Droning of bees in the clover beds,
Drowsy sounds in the grass.

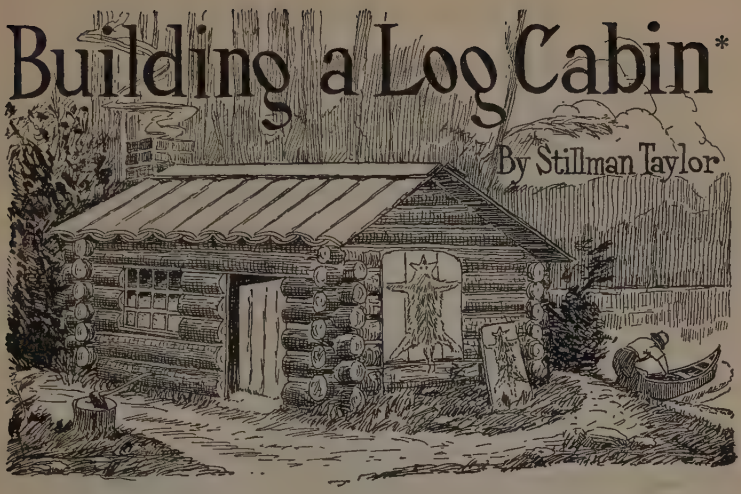
Laughter and shouts at the river's brink,
Naked bodies that gleam,
Poised for an instant, then plunged to drink
Delight in the clear, cool stream.

Lengthening shadows out of the west,
Notes of a bugle shrill,
Bacon diffusing alluring zest,
Tumult down from the hill!

Horned owl bent on his mission dire,
Winging in muffled flight,
Red glowing coals of a dying fire,
Burning a hole in the night.
—F. J. P. in *Boy's Life*, the Boy Scout magazine.

Building a Log Cabin*

By Stillman Taylor



FOR the building site, pick out some sheltered spot on slightly elevated ground, with good drinking-water and plenty of straight timber close at hand. For material, spruce, pine, white cedar and hemlock are the favorites, but any wood may be used. The hard woods, however, ash, oak, etc., are heavy to handle when green. When felling your timber, pick out trees as straight as possible, of uniform diameter. Logs of any size may be used, but the diameter should be in proportion to the size of the cabin. For the average size cabin, logs about eight inches in diameter are the best.

The logs should be not less than two feet longer than the inside dimensions of the cabin, to allow for the lock joint at the corners. A ten by twelve foot cabin will afford comfortable quarters for two, and a twelve by sixteen foot house makes a very commodious home in the woods. As the method of construction is the same, any desired size may be constructed from the illustrations. By building two separate cabins, about eight feet apart and roofing over the whole, a double cabin,

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known as the "saddle-bag house," may be erected. Doors and windows may be made of a suitable size.

For the side walls of a ten by twelve foot cabin, thirty-six logs, eight inches in diameter, will be required. Half of these should be fourteen feet and the others twelve feet in length. This will build a wall about six feet high, which may be increased if wanted.

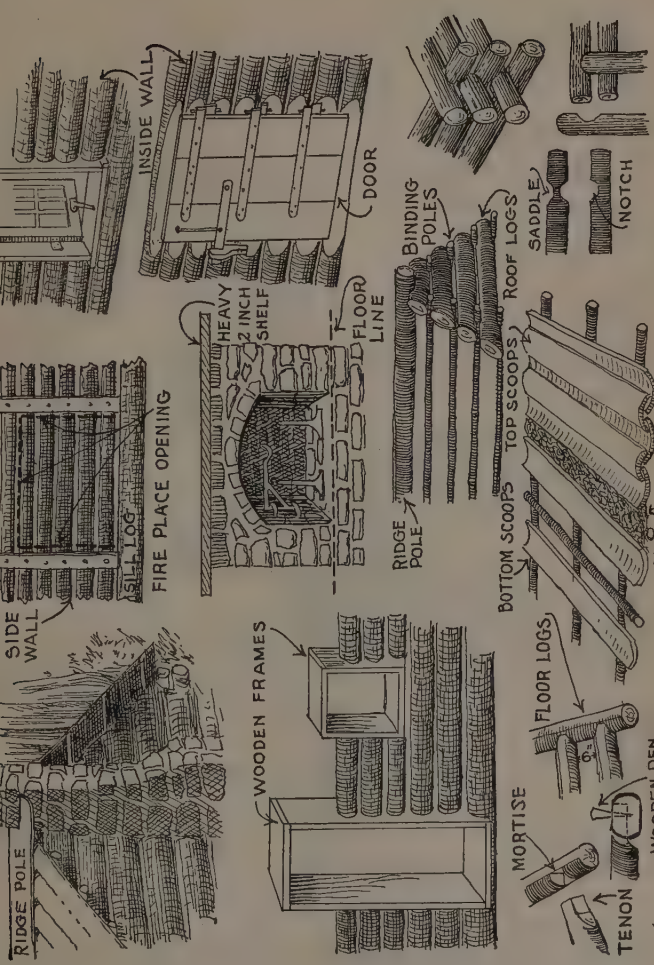
All the building material may be hewn from the log, but a better finish and much labor will be saved by taking along enough boards for making the door, windows, door-frames, and the floor. The bookcase, gun cabinet, cupboard, etc., may be fashioned from packing boxes.

Begin the cabin by staking out its length and width, and leveling off the ground. It may rest on the ground, but it is better to sink supporting posts about three feet deep, with the tops sawed off level, about six inches from the earth. Place a post at each corner and one in the center of each bottom log.

The logs are notched as shown to form the walls. To keep the walls level, use logs of nearly the same diameter, or if some are tapering, reverse the butts to even up the building line.

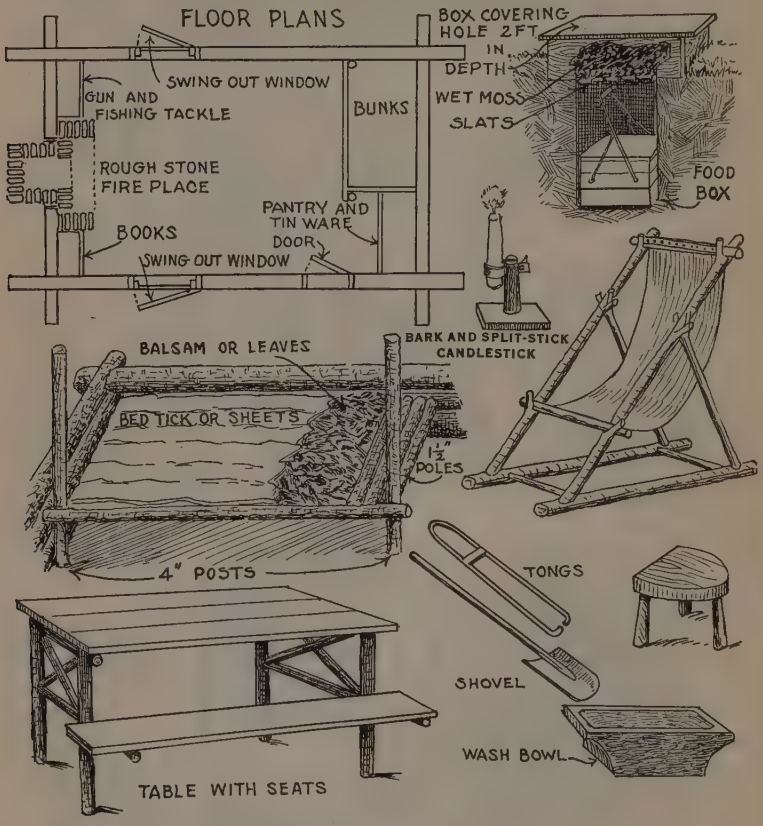
Openings for the door and windows are easily made as the work proceeds. The logs are cut off square to butt snugly against the frames, and nailed solidly. The frames may be hewn from logs, or boards may be used. To avoid difficulty in getting special sized sashes, it is a good plan to buy the windows and make the frames to fit them while building the walls. The sills should slope outward to shed water.

When the side walls are six or six and one-half feet high the end gables are laid. A fairly high-pitched roof will prove more weather-tight. By running poles across, a loft may be built in which to store away skins and camp duffel. For the roof, boards may be used, or the trough roof shown at A, may be constructed. For the scoops, pick out a few trees of the right length and split them through the center. Hollow them out


RIDGE POLE
SIDE WALL
BATTEN STRIP
SILL LOG
FIRE PLACE OPENING
INSIDE WALL
HEAVY 2 INCH SHELF
FLOOR LINE
DOOR
WOODEN FRAMES
RIDGE POLE
BINDING POLES
ROOF LOGS
SADDLE
NOTCH
BOTTOM SCOOPS
TOP SCOOPS
MOSS
FLOOR LOGS
MORTISE
TENON
WOODEN PEN

by cutting a series of notches on the flat side, and then cut out the wood between the notches.

The chimney should be built at this stage. Construct this of rough stone and cement, building it up on the outside of the



end wall. The foundation for it should be two feet in the ground. A flat stone will serve for the lintel, or you can arch it over by making a wood form to serve as a mold. The fire crane is of stiff iron, fitting into sockets which act as hinges.

Embed the sockets in the stonework while the cement is soft. The important thing to remember is to provide a large smoke flue, not less than fourteen inches square with a deep throat to give the smoke an easy start. Extend top of chimney well above the ridge-pole to secure a good draft. Pieces of tin roofing sheets, or sheets cut from large tin cans, may be used to flash around the chimney. Insert the edge of sheet between the stones. While the cement is soft, bend it down and let the end project under the ridge-pole. Overlap each sheet and the roof will shed water.

A tamped earth floor is often used. A rough wooden floor may be laid by smoothing the tops of the logs, but a board floor is best. Any cheap lumber will serve. In the illustration details are given for fitting the floor joists to receive a board floor. A good substantial door may be made and hung on by iron hinges. The door should be hung to open inside.

Single sash windows are best, and should be hinged to swing outward. A wooden strut may be added to keep the sash open to any desired angle, and a hook and eye will fasten it securely.

Bunks may be constructed double, one berth over the other. Camp furniture may be constructed from boxes and odds and ends of lumber. A few useful devices of rustic form are shown.

A WOODCRAFT CABIN AND HOW TO BUILD IT

By PHILIP D. FAGANS

UPON a certain occasion Ernest Thompson Seton, Chief of the Woodcraft League of America, was invited by a World's Assembly of Boys' Workers, met in convention at Blue Ridge, North Carolina, to come and teach them how to build a simple Woodcraft cabin of wildwood material only

(such material as might easily be obtained in almost any woods), with the idea of showing how simple and attractive such a cabin could be made by boys anywhere throughout the country, and at very little cost.

The author and a few other congenial spirits, under the direction of Mr. Seton, set to work with a will to see what could be done. We had decided to use no nails, only simple wooden pegs in their stead, but time proved too short, and some few nails were finally used. But before we go further, let us have the story of "Why a Woodcraft Cabin," as told by Mr. Seton himself in the "Woodcraft League Totem Board."

When Moses instituted the Feast of Tabernacles and started the world out on an annual camping trip, he undoubtedly had several good reasons in the back of his mind. I imagine the smallest of them was in reference to the very poor but necessary trip that his people, his "forty-niners," made across the "plains."

The most important part of it all probably was the complete hark back to the primitive. His people were told to put on wilderness clothes, eat wilderness food, dwell in wilderness tabernacles, and live the wilderness life their fathers had done in the desert.

The resumption of simple life was essential—this elimination of the middleman—the masterful contact of the man with wild nature—this elemental face to face of man and the wilds.

I am sure this is the most valuable thing in it, and when I see a New York family building a Fifth Avenue mansion in the Adirondacks, then nailing a few slabs on the outside and calling it a "camp," I marvel at their poverty. It does not surprise me when I learn that they add tennis, billiards, moving pictures, etc., to relieve their boredom. It does not surprise me, but it fills me with sorrow.

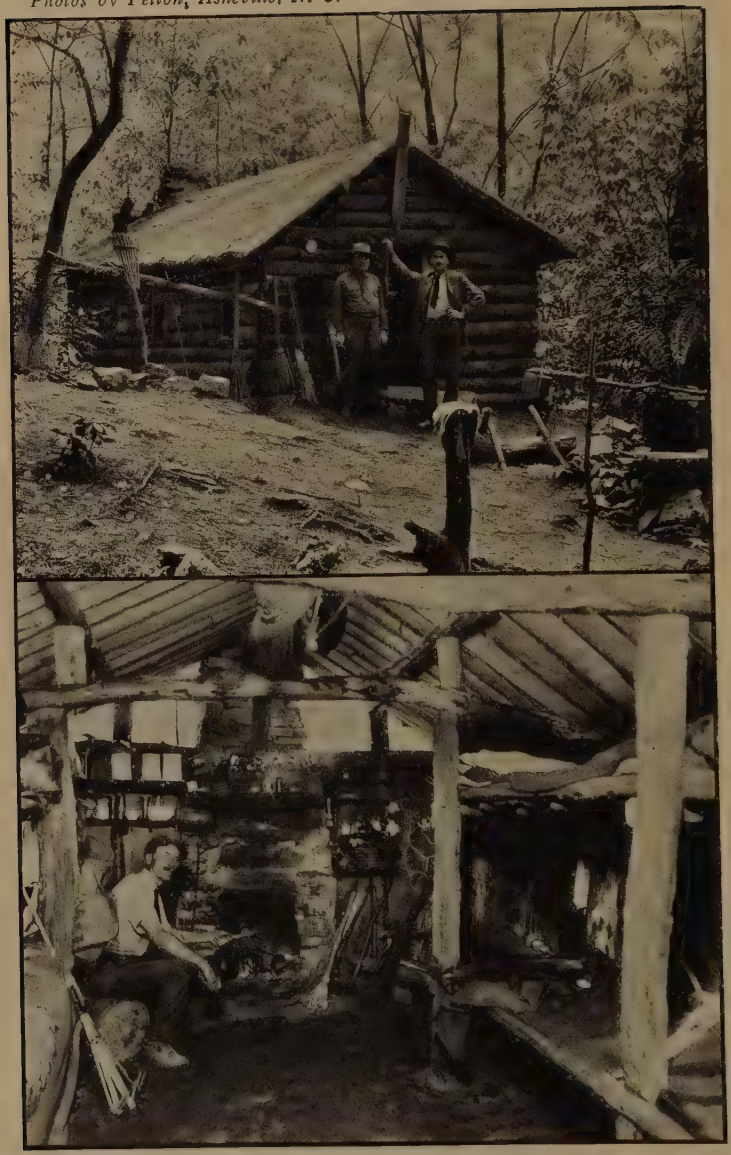
Let us face the matter frankly. There are certain great benefits and certain great dangers in camp life.

The good things are the sun-and-air life, the calm, the sweetness of the night, and the total change of thought and

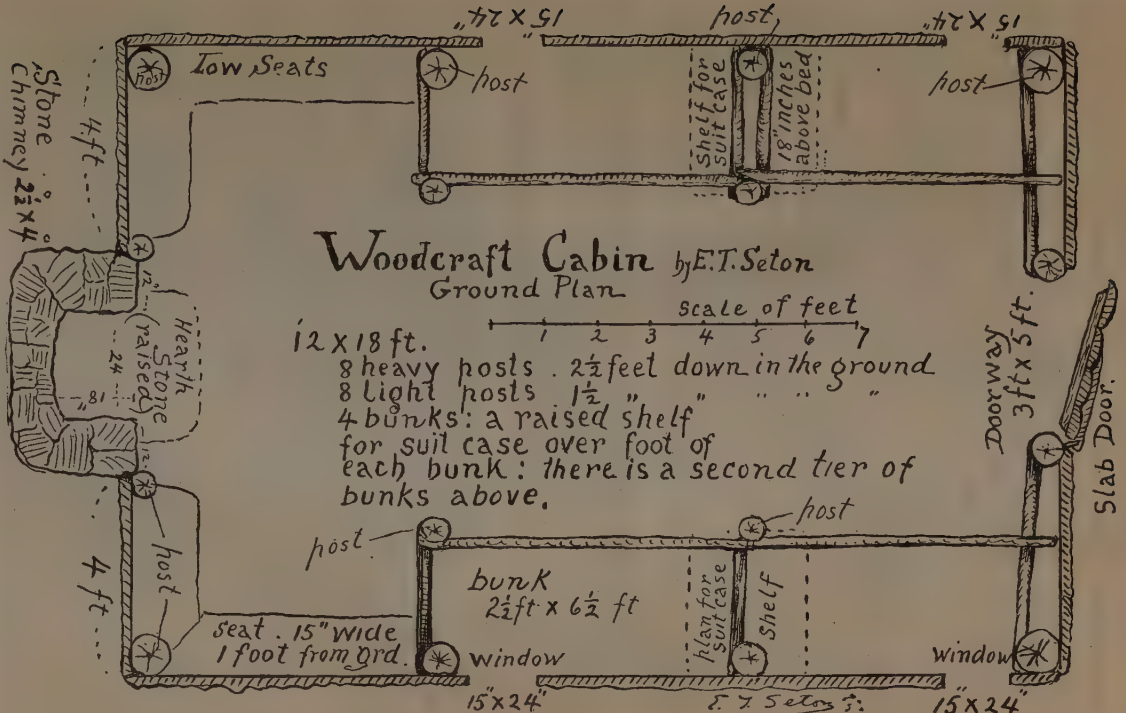
Courtesy of National Council, Boy Scouts of America

BUSINESS BEFORE PLEASURE, BUT THERE'S A HEAP OF FUN BUILDING YOUR "LODGE BY THE LAKE"

Photos by Pelton, Asheville, N. C.



Upper—WOODCRAFT CABIN, BLUE RIDGE, NORTH CAROLINA
Lower—INTERIOR OF SAME CABIN
The figures are Ernest Seton Thompson and Dillon Wallace


15 x 24"
post
15 x 24"
Low Seats
post
post
shelf for suit case
18" inches above bed
Stone Chimney 2½ x 4'
4 ft.
Woodcraft Cabin by E.T. Seton
Ground Plan
Scale of feet
1 2 3 4 5 6 7
12 x 18 ft.
8 heavy posts . 2½ feet down in the ground
8 light posts 1½ " " " "
4 bunks: a raised shelf
for suit case over foot of
each bunk: there is a second tier of
bunks above.
Hearth Stone (raised)
Doorway 3ft x 5 ft.
Slab Door.
post
post
bunk
2½ ft x 6½ ft
shelf for suit case
shelf
4 ft.
post
seat . 15" wide
1 foot from grd.
window
window
15"x24"
E T Seton
15"x24"

home world. This last is maybe the best of all, yet the one that some campers are deliberately leaving out.

It seems to me that we should begin our camping plans by leaving out everything unnecessary that we can get at home or in town—mansions with oriental fittings, electric lights, graphophones, yes, baseball and tennis as well as billiards, motor boats, and motor cars, because we can get them elsewhere. They belong to another life.

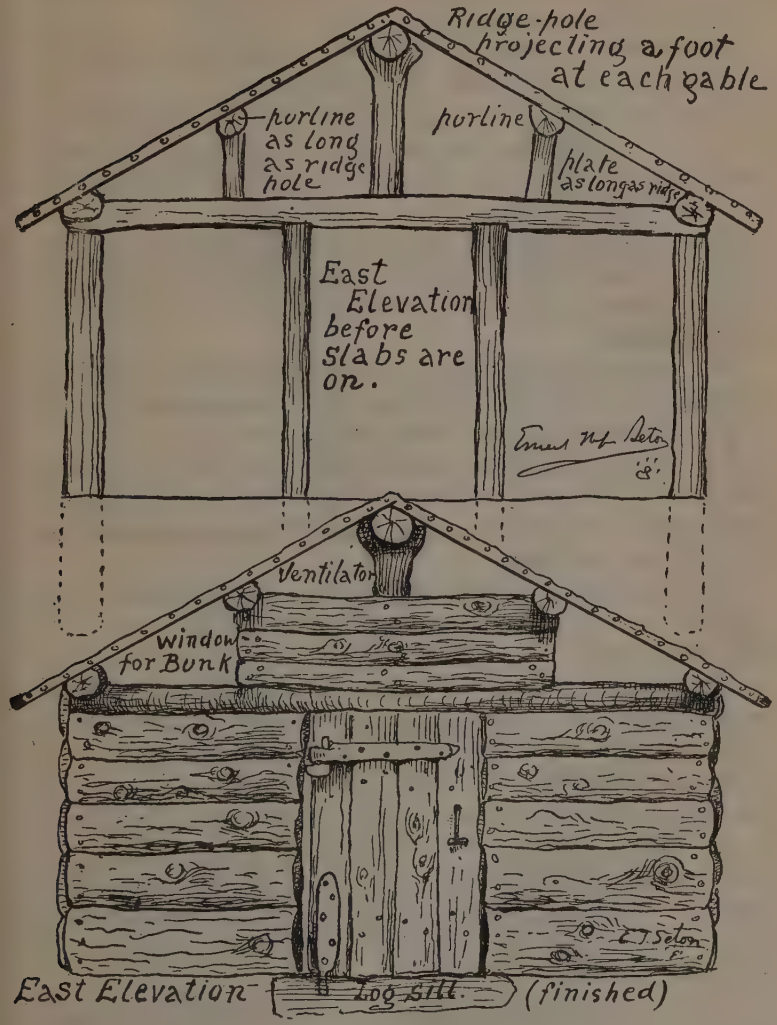
For the complete hark back, we have two usual plans. One, the wilderness traveling trip in which we are perforce tied to dog tents and one-night stands. This is very close to ideal. But a much larger number are limited to the permanent camp, and it is for these especially that this message is meant, and for father and son as they plan their summer's outing together.

As long as your permanent camp is of real tents or tepees and close to the ground and hallowed with wood smells, you are getting the big, good thing.

It is for these that the Woodcraft Cabin was built and is now recommended.

For full practical application, each little group should, as far as possible, make their own camp out of material secured by themselves from the surrounding woods or country. One of the group is needed who is artistic as well as constructive, and has woodcraft instincts, because, from the very nature of it, every camp must be a separate proposition. In Maine, we are free to cut and use all the soft timber we want. In Carolina, it would be more or less of stone, but in Texas, there is no choice but "dobies."

The Woodcraft cabin is full of the beauty of the things that grow. It has the glorious smell and magic of the woods. Its every feature stands for a little triumph of the owners over the wide world about. It has all the charms of beauty, personality, conquest, and romance. The very fact that everything in it was made by the owners' hands lends a consecration that


Ridge-pole projecting a foot at each gable
purline as long as ridge pole
purline
plate as long as ridge
East Elevation before slabs are on.
Ernest Thompson Seton
Ventilator
Window for Bunk
E. T. Seton
East Elevation
Log sill.
(finished)

cannot be got in any other way. Last and largest, it may be blessed with the crowning glory of the open fire.

The cabin may, in short, be a wonderful spiritual experience that the bungalow or house can scarcely be.

But all of this is providing that the cabin be of true Woodcraft construction, not one of those hideous machine-made things ground out by the mile and sold by the foot, that are sometimes called "cabins."

Roosevelt was a good Woodcrafter, and he is credited with a saying that sums up the spirit of Woodcraft, if we assume the outdoor surroundings. It is "Where you are, with what you have, right now."

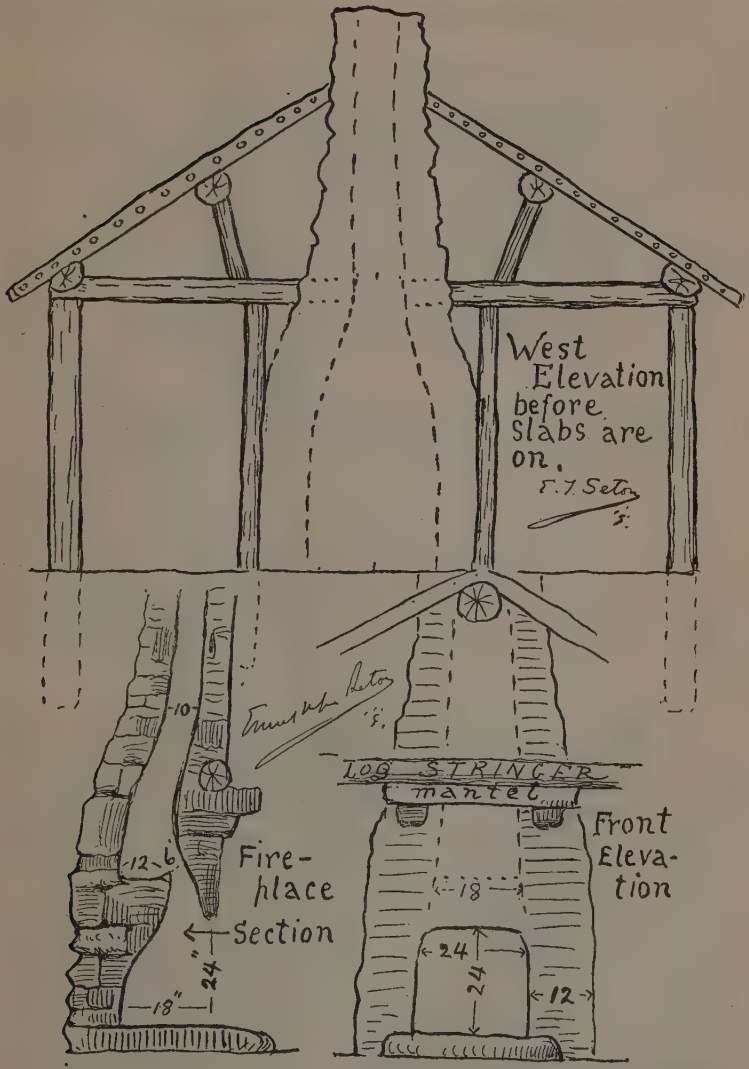
The demonstration cabin at Blue Ridge aroused such an interest and enthusiasm that plans have been carefully made of the whole affair for the benefit of boys everywhere.

Please note all are free to use these plans, but it is asked that those who do so, even in a modified form, retain the name Woodcraft Cabin and give credit to the Woodcraft League, for this is a point of honor.

The Woodcraft Cabin at Blue Ridge was twelve feet by eighteen feet. It was five and one half feet at the eaves, and nine at the peak.

Its posts were about six inches through and of chestnut (cedar would have been better), and two and one-half feet in the ground, cut off level after they were in. The roof was of spruce slabs laid flat side down. At the eaves they projected one foot or more. On them was placed heavy rubberoid roofing paper, which was allowed to sag naturally over the rounded sides of the slabs, giving a pleasant variant to their surface. At the gable ends it was bent over and nailed on the edge of a thick slab. At the eaves it was allowed to be flat, and was nailed on top.

The walls are of slabs nailed flat side in, against the upright posts. The cracks between slabs are covered either with rubberoid or short slabs, nailed on the inside.


West Elevation before Slabs are on.
E. T. Seton
LOG STRINGER
mantel
Front Elevation
Fire-place Section
10
12
6
18
24
24
18
24
12

There was no floor except the clay, which was smoothed and hammered flat.

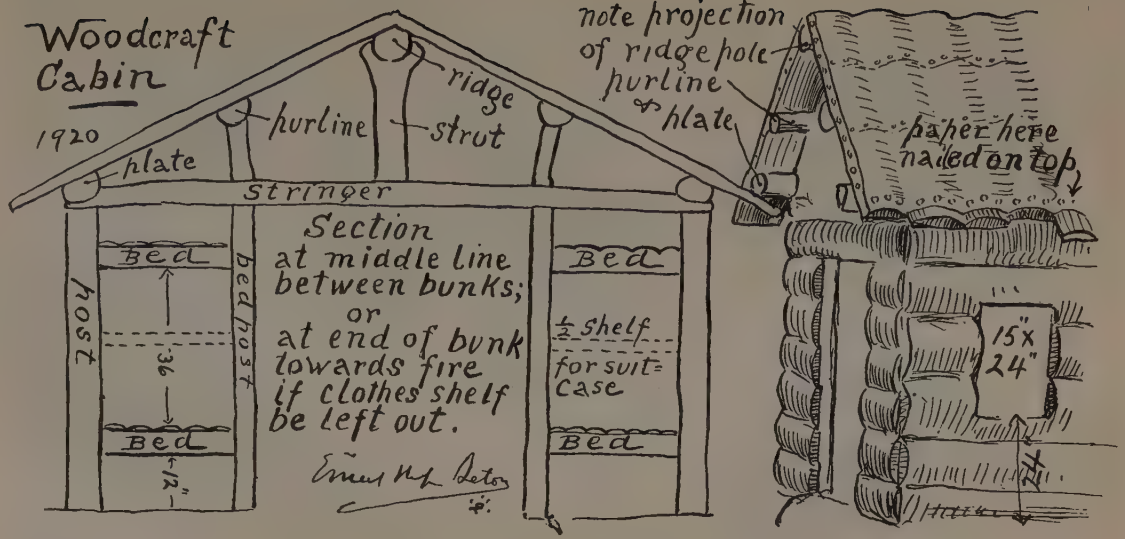
Cost of Cabin

2 cords of slabs (2 loads, about 100 slabs)	$ 10.00
3 rolls rubberoid roofing paper at $2.00	6.00
10 lbs. 5″ nails, 10 lbs. 4″ nails, 5 lbs. 3″ nails (25 lbs. at 8 cents)	2.00
2 bags cement for fireplace	2.00
1 load sand	1.00
Odds and ends	4.00
	$ 25.00
The labor of laying up stone and hauling slabs cost about	75.00
Total	$100.00

The stone and timber we gathered in the nearby woods. The tools were on hand and are not charged into the cost. Of course, the labor item will vary somewhat in different localities.

Furnishings for the Cabin

The Hickory Sapling Beds.—While the cabin was being built, a good number of hickory saplings, averaging an inch or an inch and a half in diameter, had been cut. The bark was stripped off and an extra heavy sapling was used for the front and back of the bed springs we were making. At intervals of one inch, other saplings were laid alongside until we had a lattice work of saplings about six and one-half feet long and two and one-half feet wide. If one sapling was too short, another was spliced to it, making sure that there was plenty to lap. I think, however, it would be better to make sure each sapling will run full length of the bed. The hickory bark was used to fasten the saplings together solidly and was woven in

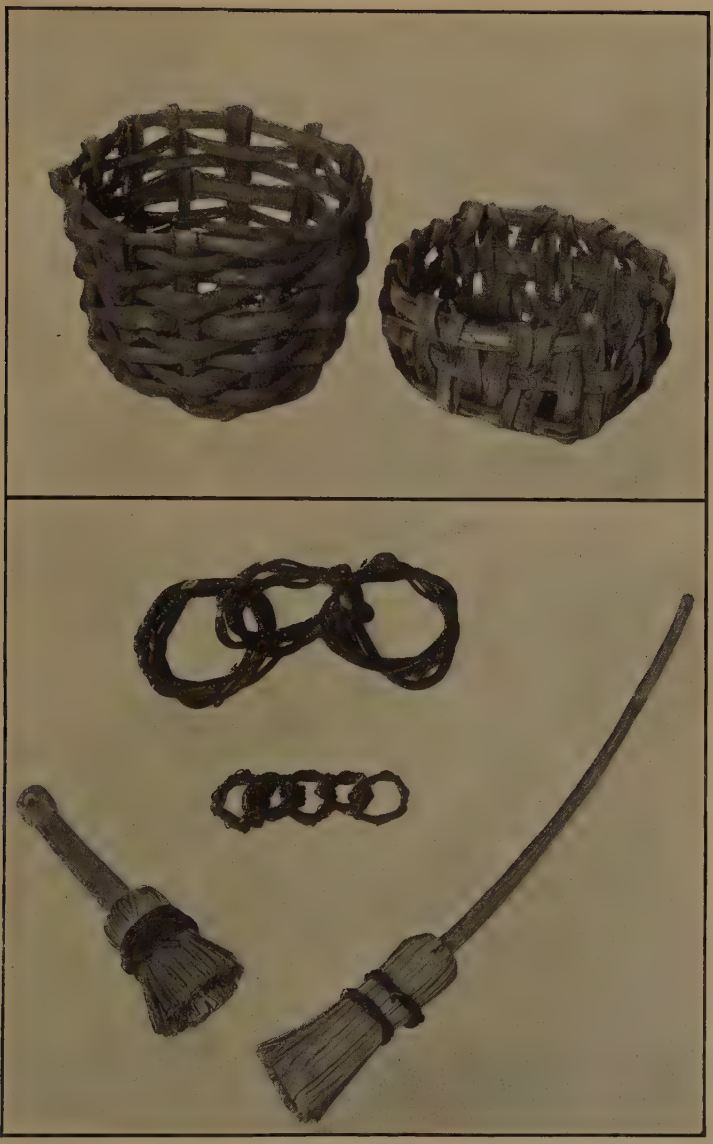

Woodcraft
Cabin
1920
plate
purline
ridge
strut
Stringer
host
bed post
Bed
36
Bed
12"
Section
at middle line
between bunks;
or
at end of bunk
towards fire
if clothes shelf
be left out.
Bed
½ shelf
for suit-
case
Bed
note projection
of ridge pole
purline
& plate
paper here
nailed on top
15" x
24"

and out to hold them so. The saplings were long enough to have a good spring. On some of the beds we nailed the ends of the saplings to the crosspieces of the bunks, but later the sapling springs were put together outside and merely placed in the bunks. This also enabled us to turn the springs when they became too much bent. It is best to experiment, but there are a number of points to keep in mind. The saplings should not be too thin, or they will not hold the weight. They should not be too thick, or there will be no give. They should not be used until thoroughly dry, or they will sag and make an uncomfortable bed. With such a spring made of hickory saplings and a mat made of grass thickly woven together, one would have a fine woodsy bed entirely made by his own hands. Unfortunately, we did not have time to get the grass and had to content ourselves with simple mattress pads.

The Wooden Hinges.—If you will look at the sketch, you will see that our hinges were from the woods and not the hardware store. A good solid hickory branch, shaped as near like a letter "L" as possible, was cut from a tree, whittled into shape, and one end driven into a hole bored for the purpose in the door-jamb. A hole bored into the crosspiece on the outside of the door fitted onto this hook, while the point from a piece nailed onto the bottom of the door fitted into a hole in the log doorsill. The hinge worked beautifully. The only shortcoming it had was a tendency to squeak, but as this gave away those who came in late and served as a warning of possible enemies, it was a redeeming feature after all.

We put in some slab seats at the end around the fireplace, drove some wooden pegs in the log over the fireplace, and hung up our cups and cooking utensils. Mr. Seton even found a branch with three little limbs. He nailed the small end to the roof beam, letting the branch hang down with three clothes hooks—a great place to hang hats.

Every morning we, with a few guests from the hotel, cooked our breakfast in the open fireplace. Every night we sat around



BASKETS OF BARK, CHAINS, WITHES, AND BOOMERS MADE BY WOODCRAFTER

Upper—TIN CAN CAMP EQUIPMENT
Lower—HOME-MADE EQUIPMENT

the fire and had stories of the north and of the woods by Mr. Seton and Mr. Dillon Wallace.

Some of the Things We Made.—During the few days that we were together in camp, a great many things were made. One man took the strips of bark from the hickory saplings, soaked them in the mountain stream that ran nearby, and made himself a hickory basket which was solid and serviceable. (See the photograph.) Try the thing out for yourself and see what kind of a basket you can make.

Mr. Seton found the earthen floor rather cold on the bare feet, in the early morning, so he set himself to the task of making a mat two feet square, of hickory bark. This he placed by the side of his bunk and used it with great satisfaction.

Several of us had seen brooms made by taking hickory, or maple wood, and shaving the ends, then pulling the shavings down over the split end, as in the sketch. At least we had seen the finished product and started out to make some for ourselves. But we found that our knives would slip, and that the shavings were of varying width and thickness, until someone suggested that if we would take off some of the outer layer and then, with our knives, get hold of several fibers and pull them down, we would do better. This we tried and found it worked. I am including a photograph of a "boonder" made this way by Frank Stoll, also several withes made by him from hickory switches, as well as a hickory bark rope.

Several men made lanterns from tin cans with a candle inside, which worked very well. It was a constant source of wonder and pleasure to see what one could do with simple tools and materials found in the woods. Again note the photograph showing other woodcraft articles, such as woodcraft candlesticks, bark baskets, grass mats, switch brooms, and plates. Any boy can successfully make such things in infinite variety with a little trouble and imagination.

Mrs. Fagans, the children, and I were camping several Summers ago in Maine, up on Moose Pond, and we discovered

that we had no large spoons for cooking. Although I had never made one before, I went out and produced an excellent long-handled spoon for stirring. When it was finished I realized that it would not stand much of a strain, so I made a second of white birch and then, feeling ambitious, I made a third one of iron wood or hop hornbeam. It is an easy stunt, the only task being not to split your bowl and to hollow it out nicely. The latter, I found, was not so difficult if you started in the center and twirled your knife from the center, cutting, you might say, in circles.

We needed an extra cup, so I took a condensed-milk can and smoothed the top edge with a file. Then I took a piece of white birch (though a later one made of hickory was even better), and made a handle. I put two small holes through the can at the top on each side of the seam, fastened the handle to the can with a piece of copper wire, bent the handle to the bottom, and ran a piece of wire from it around the bottom rim. When finished, I had a drinking-cup that was the best of the lot. From then on the children took turns at each meal using it.

The Tea Stick Fire.—One Sunday afternoon Mr. Wallace showed us how to make the tea stick fire used in Labrador when the explorers stopped for a few minutes in the middle of the day. A stick is driven into the ground and the kettle suspended over the fire. If the stick does not hold well, a rock is put at one end to hold it solid. Then, with leaves and little twigs, a quick fire is made and the water is soon boiling. We made our tea and served it in tin cups, pretty strong and with lots of tea grounds, but our friends said it was good, so we felt we weren't so bad.

Roasting Eight Legs of Lamb.—Although it was raining during the afternoon, we invited the delegates from the twenty-eight foreign lands present to come up for supper. We went ahead just the same, because weather shouldn't interfere with real woodcrafters. Under the direction of Mr. Wallace, some

racks were put up, about ten or twelve feet long and five feet high, on which were suspended eight legs of lamb. A fire was built and each leg of lamb was twisting and untwisting for a couple of hours, browning, roasting, and smelling more delicious each minute, until they were oozing deliciously. Finally, they were browned and tender, so they were taken down, cut into slices, and each guest made for himself a sandwich as he cared for it.

The main thing in roasting meat this way is to have a good roasting fire, generally with logs in back to reflect the heat forward, a strong string long enough to keep the meat turning nicely, and a skewer through the meat at each end, so it can be reversed if one end gets done more than the other. Keep the meat low to the ground, just so it can turn without touching the plate put to catch the drippings.

Mr. Wallace tells me that later he tried roasting meat, using hickory withes to suspend it instead of string, but that he had to have extra withes ready when the first dried and burned through.

I have roasted lamb, beef, chicken, and ham before the open fire in this way with complete success. There never was any meat cooked indoors that could equal the taste of meat cooked in this way.

HOW TO BUILD A COUNCIL RING

By PHILIP D. FAGANS

IF YOU really want to enjoy being in the woods at night with a bunch of fellows, the best thing is to build a "council ring" as they do in the Woodcraft League. The idea is partly taken from the Indians who had councils, but of course The League have gone beyond anything the Indians did.

The idea is to find a beautiful place in the woods where you can prepare a place to be used regularly for meetings of

councils. If you are camping, go out and see what you can discover around the camp not farther than three minutes distance, with the idea of locating a council ring. It should not be too near a road, as you want quiet and privacy. It should not be on, or too near damp ground, because of the likelihood of mosquitoes. It should be entirely surrounded by trees and bushes, if possible. If you can find such a place with a particularly beautiful tree or fine rock for a background for the Chief's seat, so much the better. It should be a reasonably level place, so you will not have to work too hard getting it into shape. Locate the three or four best places, then go back and look them over again to make sure which, all things considered, is the most desirable of them all.

Having made a choice, get a piece of cord and measure off a circle with a twelve-foot radius if the camp is a good-sized one, or, if a family camp, decide on a size suitable for your group. With your camp ax (which is always kept sharp), cut several stakes. With one end of the string at the center, have another camper take the other end of the string and swing around a circle so as to locate the council ring without cutting down any more trees than you have to. By shifting the center stake you can shift the location of the ring. When you have located the ring so as to have as many good-sized trees as possible just outside the ring, drive stakes every eight or ten feet to make the circumference.

SUPPER IS OVER—NIGHT IS NEAR

Courtesy of Ossen Photo Supply

Upper—THE FIRE LIGHTING CEREMONY
Lower—TYPICAL COUNCIL RING IN A BOYS' CAMP

Look the ground over carefully, for the next job is to grade all the ground within the stakes so that it is perfectly level and free from sticks, stones, roots, etc. Take off, first of all, all leaves, roots, or material that might possibly catch fire, and go down to the bare dirt. This is very important. As we shall often wish to build fires in the center, we must make sure that there is never any possibility of fire creeping through the dead roots or vegetable matter which usually litters the ground.

Having cleared all this material down to the bare earth, cut off the high spots and fill in the hollows with the dirt. You are likely to notice, after you have made some progress, that wherever you stand *appears* to be the low spot—but it isn't always so. However, sight over it carefully and keep working it till it is level. If you can get a straight board and a spirit level, you can run it out from the center and mark the stakes, otherwise you will have to use your eyes. What you want is a complete circle, absolutely level, entirely free from sticks, stones, or anything that might hurt campers when games are being played therein.

When the circle has been made, let each band or tent group make themselves seats on the outer edge of the circle. They may be made of split logs with legs driven in at each end from underneath, or you may make rustic seats by the use of slabs. There will need to be one and usually two entrances to the ring, a Chief's seat, which should be more pretentious than the rest, and usually opposite the Chief's seat the totem pole of the tribe or camp is erected. (See photographs and sketches.)

In the center of the council ring is the fire. Get eight, ten, or twelve logs (green if possible), twenty-four or thirty inches long and averaging four inches thick, and make a four square crib. Inside this lay shavings, fuzz sticks, fine twigs, then

larger ones, and then still larger ones, so that at night with one match, or with fire made by your rubbing sticks, you can easily light the camp-fire. The wood inside should be perfectly dry. Little twigs that snap short are dry and safe to use. If they bend, they are still green. Branches still on the tree, but dead, like the under branches of pines, make fine wood to keep the fire burning. *What you want is light, not heat.* (For cooking you want heat, not light.) Make sure you get dry wood that will burn with a good flame, and have the "Firekeeper" replenish the fire from time to time, to keep the light constant. Be sure to have a big supply of dry wood, broken into the right lengths ready at hand just outside the council ring. A greenhorn gets wood that is somewhat green, doesn't get enough wood, or in the midst of doings in the council ring disturbs proceedings by breaking wood. Don't be a greenhorn.

Here, in a secluded place in the woods, surrounded by bushes, with limbs reaching over the council ring, let us light our fire. As the fire blazes up, we see the complete circle of faces, back of each band their totem silhouetted against the darkness of the trees and the night, while we play our games, conduct our business, sing our songs, or hear stories of when the world was young. The "Firekeeper" seriously caring for the fire, reminds us of those olden days when the fire was a symbol of the Great Spirit. In such a council circle we come to get the very best from the full and wonderful storehouse of Woodcraft and Nature.

Sympathy with nature is a part of the good man's religion.—F. H. Hedge.

SIGNALING

When the maple turns to crimson
And the sassafras to gold
When the gentian's in the meadow,
And the aster on the wold;
When the moon is wrapped in vapor,
And the night is frosty cold;
When the chestnut-burs are opened,
And the acorns drop like hail,
And the drowsy air is startled
With the thumping of the flail—
With the drumming of the partridge
And the whistle of the quail:
Through the rustling woods I wander,
Through the jewels of the year.

—BAYARD TAYLOR.

MR. FAGANS ROASTING A LEG OF LAMB IN THE OPEN

HICKORY STICK BED, GRASS MAT, AND WOODCRAFT BROOM

ON BEING LOST*

By GEORGE GLADDEN

SOON or later everybody who travels much in the woods—*real* woods—is likely to get lost. The tenderfoot (scout or otherwise) does; the experienced woodsman does—even the Indian sometimes does. But the Indian often won't admit it, at least to a white man; from which trait probably originated the classic story about the redskin, who, when he was accused of being lost, replied, indignantly,

"Injun no lost; wigwam lost; Injun *here!*"

Astray or Lost

There is a difference between being *lost* and being *astray*. For example, you may suddenly realize that you are traveling northwest instead of north, which you had supposed and desired to be your course; and that discovery may cause not a little confusion in your mind. As long as that confusion lasts, you are *astray;* actually you are no longer really astray as soon as you realize your error, and begin to travel north.

Again, if you confidently expect to see a certain landmark—say, a big ledge on a mountain-side—from a trail or road from which you believe it to be visible, and it isn't there, you are certainly astray, and perhaps *lost*, as far as that ledge is concerned. Wherefore it behooves you to find out promptly just *why* you have missed seeing the ledge. Otherwise you

* Excerpts from the Merit Badge Pamphlet on Pathfinding, Published by the National Council, Boy Scouts of America. Used by their permission.

are likely to get still farther off your course. For, depend upon it, *the ledge hasn't moved*—that is, the wigwam isn't lost. The mistake that many an inexperienced person makes lies in blundering along, and trusting to luck, with the result that presently he is lost, "for fair."

How It Feels

With this realization is likely to come a sense of bewilderment which becomes more and more acute. The sun is setting in the *east;* the compass points due *south.* As Horace Kephart correctly and vividly described the predicament: "A man is really lost when suddenly (it is always suddenly), there comes to him the thudding consciousness that he cannot tell, to save his life, whether he should go north, east, south, or west. This is an unpleasant plight to be in, at any time; the first time that it is experienced the outlook will seem actually desperate.

"Instantly the unfortunate man is overwhelmed by a sense of utter isolation, as though leagues and leagues of savage forest surrounded him on all sides, through which he must wander aimlessly, hopelessly, until he drops from exhaustion and starvation. Nervously he consults his compass, only to realize that it is of no more service to him now than a brass button. He starts to retrace his steps, but no sign of footprints can he detect. He is seized with a panic of fear, as irrational but quite as urgent as that which swoops upon a belated urchin when he is passing a country graveyard at night. It will take a mighty effort of will to rein himself in and check a headlong stampede.

"In such a predicament a man is really in serious peril. The danger is not from the wilderness, which, pitiless niggard though it be to the weak-minded or disabled, can yet be forced to yield shelter and food to him who is able-bodied and who keeps his wits about him. No; the man is in danger from himself." *

* Horace Kephart, "Camping and Woodcraft" (1917), Vol. II, Chapter 2.

What to Do About It

It has been said that it is useless to give a tenderfoot advice about what to do when he is lost, because immediately he realizes that fact he becomes panic-stricken, and temporarily a lunatic who will not recall any advice, however sound and obviously sensible, he may have received and accepted as such when he was responsible. But that is begging the question. Besides, as a matter of fact, the utter mental irresponsibility produced by the consciousness that one is lost, probably never develops instantly. Rather it is in most cases a growth, often rapid, it is true, but rarely, if ever, one which may not be checked at the outset. Therefore, practically all experienced woodsmen, and other sensible persons who have considered the subject carefully, will agree on something like this as the first thing to do when you discover that you are lost:

Do nothing. *Sit down on the nearest log. Make yourself* sit there for at least half an hour, and *make yourself* think—about what you have been doing for the past hour. How long ago was it when you were *sure* of where you were, and in what direction were you traveling then? Where is that point now? Is it uphill or downhill, or both? What kind of country in a *general* way have you come through meanwhile? Don't try to remember fine details—only *general* features. By the time you have forced yourself to answer intelligently these questions, perhaps something like a sense of humor will come to your rescue, and you will begin to ask yourself questions like these:

"If I don't know which way I am going, or where I shall come out, why should I hurry?" Or:

"If I am in for a long, hard hike, why should I go at it as if I were tackling a 220-yard hurdle race?"

Comparatively little of this deliberate and connected thinking is likely to bring a person to his senses: to transform him from an incipient madman into a rational being. "Certainly,

as Mr. Kephart says, "it is true that if a man in such straits permits panic to conquer him, he is likely to perish or come out of the woods a gibbering lunatic. There have been many such cases. But it is not true that they are the rule. Thousands of wayfarers have been lost for a day, two days, or longer, without losing their self-command. And there is really no valid excuse for an able-bodied person going out of his head from being bewildered in the big woods so long as he has a gun and ammunition, or even a few dry matches and a jack-knife," which, at the least, are likely to be in the possession of every scout who has had sensible training even in elementary woodcraft.

As to ways of getting lost, they are, of course, very numerous; also most of them are easily avoided if one keeps his wits about him. "There is no man, white or red, who is not liable to lose his bearings in strange woods if he is careless," says Mr. Kephart, in his book just quoted. And he continues: "If an Indian is seldom at fault as to his course it is because he pays close attention to business; he does not lose himself in reverie, nor is his mind ever so concentrated on an object that he fails to notice irregular or uncommon things along the way. And yet, even Indians and white frontiersmen sometimes get lost."

A Near-Lost Experience

The present writer may be pardoned for relating a near-lost experience he had in the New Brunswick forests a few years ago, because it illustrates a mistake which is often made, and sometimes with serious consequences. With an expert moose-hunter and woodsman who was familiar with the region, he was enjoying that fine sport from a base camp established in the cook-shack of an abandoned lumber camp. Through the camp passed a small brook, on its tortuous way, mostly through thick undergrowth (chiefly of laurel) to the Dungarvon River, about half a mile to the northeast. There were

plenty of trout in this stream, and some of them were needed —or at least would be appreciated—for supper.

So the writer set off from camp alone, along a trail which he knew crossed the stream about 500 yards (in a straight line), below camp. At this crossing stood a big spruce whose trunk was plainly blazed at about shoulder height. It was practically impossible to get at the stream through the laurel tangle, and the fisherman didn't try. He contented himself by fishing in the few comparatively open places, which could be reached by making détours around the laurel. In this manner he made his way (mainly along the west bank of the brook), nearly to the river. Then he turned back toward camp, following the east bank, but making détours, as before, to avoid the laurel tangles.

Presently he began to have a feeling that he was getting off his course—that he was not traveling upstream in a direction which would parallel his downstream course. Still, there was the brook, and he certainly was traveling *upstream*. The fact that he did not recognize the stream whenever he came within sight of it—that the banks looked like those of a different brook—he accounted for by reasoning that the places he was seeing now might be spots which he had passed in his downstream détours on the other side. Besides, there was so much laurel and so little noticeable high timber, with no conspicuous landmarks, that he kept on, fighting his way through the undergrowth.

"Wigwam Lost"

But where were the trail-crossing and the blazed spruce? Surely, the fisherman thought, I have not overlooked them. More brush-bucking and more misgivings. Finally a dead halt, a seat on a log and these conclusions: "First: I have not seen this country before. Secondly: I have not seen the blazed spruce, nor the trail crossing the brook. Thirdly: I have certainly traveled farther *up*stream than I did *down*, from

the spruce. Therefore, I believe this wretched stream has a branch *east* of the one I followed, that the two forks join somewhere in the laurel tangle above the trail; that I missed that junction in one of my détours, and that I am now on the east fork, a little south but a good deal farther east of camp. I could fight my way through the laurel downstream to the west fork and then back upstream to the trail and to camp. Or I might strike camp by heading west by north from here. On the other hand, I might miss it and have to fight this undergrowth for a mile or more before striking the tote-road leading to camp. Very likely I am within shouting distance of camp now. Anyhow, I am going to try." There was a prompt response to the "Hello!" It proved that the fisherman's diagnosis of this case was about correct, and in a few minutes he had met his guide and was on the way back to camp.

The Treacherous River

Doubtless hundreds of hikers in the wilderness—especially fishermen—could relate experiences very much like this one. And not a few could spin yarns about men who have been badly lost, and have had an ugly time getting out of a predicament actually as simple—at first—as the one just described, all because they have lost their heads—or most of the contents thereof. Mr. Kephart (in the chapter previously quoted from), describes very plausibly a similar hypothetical case, as follows:

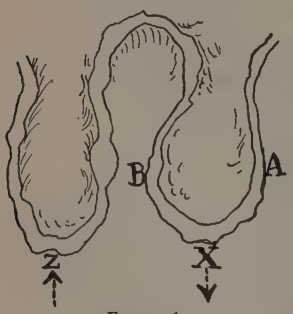


Figure 1

"In flat woods, where the watercourses are few and very meandering, the vegetation rank and monotonously uniform in appearance, and landmarks rare, a man may return within two hundred yards of his own camp and pass by it, going ahead with hurrying pace as he becomes more

anxious. In Figure 1 a man leaves camp, X, in the morning, going in the direction indicated by the dotted line. He consults his compass at intervals during the day, tries to allow for his windings, and, returning in the evening, strikes the river at Z. If he follows its bank in either direction, he is likely to spend the night alone in the woods. If the camp were at A, and the homeward-bound hunter should reach the stream at B, he would be dumfounded to find himself, apparently, on the wrong bank of the river.

FIGURE 2

"Another easy way to get bewildered is as follows: In Figure 1 we will assume that the current runs from A to Z, that a party unfamiliar with the river is descending it in a boat, and that one of the men leaves the boat at A, going ashore to hunt along the bank. At X he comes to the mouth of a deep creek, or some other obstruction, or he starts the game that leads him back into the woods. Not long afterward he reaches the river again at Z, and after hallooing and firing a shot or two, but getting no answer, he hurries on downstream, thinking that the boat got ahead of him while he was making his détour. The boat meanwhile has been rounding a great oxbow curve and may be a couple of miles behind the man ashore.

"In each of these examples the country is assumed to be fairly easy to traverse, and in each case the misadventure might have been avoided by a little forethought. A bush bent over, here and there [see Figure 2], a blaze on a tree where the underbrush was dense, would have saved all that. Without such precautions, there are places where a man can get badly muddled in a forty-acre tract. One of my companions once was lost from early morning until after nightfall in a thirty-acre patch of blue [sugar] cane. He struggled until almost completely exhausted, and when we found him he

looked like a scarecrow. At no time had he been half a mile from the cabin."

"Keep Your Shirt On"

Too much emphasis cannot be laid upon the importance of observing rigidly Rule I wherever or however you are lost. To quote again—and from the same book:

"No matter where, or in what circumstances you may be the moment you realize that you have lost your bearings, there is just one thing for you to do: STOP! Then sit down.

"Now, any man can remember that. It is a bit of 'book learning' that no man can afford to despise. It is the one and only way to clear your wits, to drive off the demon of panic, and it is sure to help you out of your predicament.

"Then, if you are a smoker, light your pipe. If not, chew a twig. It won't take long for you to recover sense enough to know that if you stay right where you are until morning your companions, by that time, will be searching for you. They will be scouring the woods, hallooing, firing guns, scouting for your trail. Suppose you do have to stay out all night, alone in the woods; nothing will hurt you. The stories of bears or panthers pouncing on sleeping men are all tommy-rot. So keep your shirt on. . . .

"But you don't want to stay here like a numskull and face the sly grins or open ridicule of a searching party? Very well, the bugaboos are fleeing. Now take a stick, make a bare spot on the ground, and trace your probable course from the time of leaving camp to the time you first suspected you might be wandering astray. Mark on it the estimated location of such landmarks as you noticed. If you are not altogether a tenderfoot, you will remember how many streams and ridges you have crossed. Anyway, you will recall some features of the country you traversed. Not unlikely, when your mind has recovered its equipoise, you will be able to 'backtrack' without much difficulty.

"But in any case, no matter how confident you may be DON'T take ten steps from the place where you are until you have marked it. If the place is favorable for a smoke sign (in flat woods it is of no avail), build a fire, with enough damp or punky stuff for a good while, and bank it with earth so it cannot spread. Or, blaze a tree on four sides—make big blazes that can be seen from any direction. . . .

"Then take note of the lay of the land around you, the direction of its drainage, the character of its vegetation, and the hospitalities that it offers to a night-bound traveler, in the way of drinking-water, sound down-wood for an all-night fire, natural shelter, and browse or other bedding. Now, when you start out to recover the trail, make bush-marks as you go along [see Figure 3]; otherwise it will be the easiest thing in the world to lose your way back to that blazed tree. . . .

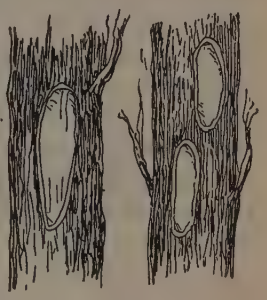


FIGURE 3

"But if you don't find that back track of yours, and if no familiar landmark shows up before the sun is within an hour of setting, QUIT for the day. It is high time, now that you go right to work and make yourself snug for the night. Your success or failure to-morrow will depend very much upon what kind of a night's rest you get."

The foregoing excerpts have been quoted chiefly to indicate to the scout the *proper frame of mind* in which to face the scrape of being lost in the woods; for that, after all, is the all-important consideration. All that Mr. Kephart and other similarly experienced and sensible woodsmen have to say as to ways and means of getting out of the scrape harks back to the initial warning. KEEP COOL. DON'T GET RATTLED.

How to Read a Compass

There is nothing especially difficult about the reading of compass bearings. One should stand facing squarely in the direction of the road or other feature whose bearing is to be taken, holding the compass in the palm of one hand, at the height of his breast. With the other hand one turns the box gently until the north (blue) end of the needle is over the north point. This is called "orienting" the compass. There is no need of trying to bring the needle to a complete rest; if it is in healthy condition, it is bound to keep on swinging and quivering slightly anyhow. All that is necessary is to make sure that it swings an equal number of degrees to right and left of the mark. Then one glances quickly over the pivot in the desired direction and reads on the far side of the box the graduation through or near which the line of sight passes. In any case the bearing can be read to the nearest two or three degrees.

Learn These Two Systems

On some compasses the degrees are numbered from zero all the way around to 360 (clockwise fashion); on others they are numbered in each quadrant from zero to 90. On the former style of compass, bearings should be read as numbers simply, as, for instance, 35, 124, 266, 318. On the latter, on the other hand, the same bearings should be read as follows: north 35 degrees east (or, simply, north 35 east, but not 35 northeast, nor northeast 35); south 54 east, south 86 west, north 42 west. A scout should be able to use either system, and to convert either into the other.

Natural Compass Marks—Moss

Especial attention may, however, be directed to a few principles and tricks of the pathfinder's trade which every scout should understand, and should be able to apply

accurately and promptly in the emergency of being lost. But he should be *sure* of these principles before he accepts and acts upon them. For example, probably everybody has heard that moss grows on the north side of a tree, a most convenient thing to know if it happened to be *true*, which, however, *isn't always the case.* (Remember, incidentally that the thin, gray parasitic *lichens* which grow on both rocks and trees, are not *moss.*) True moss is to be found on that side of the tree which *retains longest the most moisture*, and that may not necessarily be the north side. For example, moss will grow most readily on the *upper* side of a *leaning* tree, because naturally that side retains moisture longer than the lower side. Wherefore, a believer in the moss-on-the-north-side-of-the-tree theory, would be thrown completely off his course if he should be guided by the moss on a tree leaning to the north, for then, of course, the growth would be on the *south* side of the tree.

Again, moisture remains longer on *rough* bark than on *smooth*, and within the forks of trees and about their swollen bases, without any regard for the points of the compass. "Does it follow, then," asks Kephart, "that exposure has nothing to do with the growth of moss? Not at all. It merely follows that a competent woodcraftsman, seeking a direction from moss on trees, would *ignore* leaning trees, uncommonly rough bark, bossy knots, forks of limbs and the bases of trees, just as he would give no heed to the growth on prostrate logs. He would single out for examination the straight shafted old trees of rather smooth bark, knowing that on them there would be a fairly even lodgment of moisture all around, and that the wet would evaporate least from the north and northeast sides of the tree, as a general rule, and consequently that on those sides the moss would preponderate. He would expect to find such difference more pronounced on the edge of thick forests than in their densely shaded interior. He would give special heed to the evidence of trees that were isolated enough

to get direct sunlight throughout a good portion of the day, while those that were in the shade of cliffs or steep mountains, so that they could only catch the sunbeams in the morning or afternoon, would be ruled out of court.

"You see how much more swiftly and surely such a man would reach a decision than could one who tried to take into account all kinds and conditions of trees, regardless of surroundings, and how much less he would have to puzzle over contradictory evidence. Among a hundred trees he might only examine ten, but those ten would be more trustworthy for his purpose than their ninety neighbors. This is woodcraft—the genuine article—as distinguished from the mysterious and infallible 'sixth sense' of direction that, I think, exists nowhere outside of Leatherstocking Tales."

Mr. Kephart also records the interesting observation that *generally* "the feathery tip, the topmost little branch, of a towering pine or hemlock, points toward the rising sun, that is to say, a little south of east . . . leaving out of consideration those growing in deep, narrow valleys, or on windswept crests;" also that "the bark of *old* trees is generally thicker on the north and northeast sides than on the other sides."

All of this, and much more of the same sort, is not only good woodcraft as such, but is valuable information for the man who is lost in the woods to have in his head—provided he makes use of that appendage. As to other natural signs which may be depended upon to indicate the points of the compass when no sign of the sun can be seen, the present writer is disposed to accept the conservative conclusion reached by Mr. Kephart, who says:

Average the Signs

"No one sign is infallible. A botanist can tell the north side of a steep hill from the south side by examining the plant growth; but no one plant of itself will tell him the story. So a woodsman works out his course by a system of *averaging* the

signs around him. It is this averaging that demands genuine skill. It takes into account the prevailing winds of the region, the lay of the land, the habits of the shade-loving and moisture-loving plants (and their opposites), the tendency of certain plants to point their leaves persistently in a certain direction, the growth of tree-bark as influenced by sun and shade, the nesting habits of certain animals, the morning and evening flight of birds, and other natural phenomena, depending upon the general character of the country traversed. Moreover, in studying any one sign a wise discrimination must be exercised."

As to the "Sixth Sense"

The present writer holds also (with Mr. Kephart) that a good deal of what has been written and said about the mysterious "sixth sense," or "bump of locality," or special "sense of direction"—call it what you will—which enables the "natural woodsman" to avoid becoming bewildered, is sheer nonsense. He knows several exceedingly expert woodsmen and hunters, born and reared in or at the very edge of forest land, in which they have passed practically all of their lives—hunting, fishing, lumbering or just roaming. Yet every one of these men confesses to having been lost, some of them several times. The true woodsman is pretty likely to be a truthful person, especially when he speaks about himself.

And so, being lost, and then recovering one's sense of direction, may doubtless be traced, in the great majority of cases, to the exercise of common sense, acting upon definite facts furnished by the *memory;* rather than to the operation of any mysterious sixth sense, or any other uncanny faculty possessed only by a favored few. As Mr. Kephart intimates, such notions may be worked into interesting fiction; but the man who knows the woods is likely to discern in them more of humbug than of the horse sense, of which woodcraft—your lost man's surest guide—is chiefly composed.

Scouts (and others) who live in cities of considerable size are probably more handicapped in the woods than they realize, because of having become accustomed to change their direction in traveling almost always by an angle of fully ninety degrees, as a result of the conventional rectangularity of most city street plans. In hundreds of cities the streets run, almost without exception, north and south or east and west. How readily a traveler may go astray whose sense of direction is governed by this right-angle principle, it is easy to imagine. Indeed, if he fails habitually to take into serious account any change of direction save one squarely to the right or to the left, he is as good as lost before he starts out to travel in the woods.

The present writer is convinced that the deficiency stated above does really affect those who are subject to it. He has noticed that scouts who have lived all their lives in New York City, for example, and who, therefore, are accustomed chiefly to right-angle turns, are likely to lose their way in a comparatively short hike through the woods by a route which involves a few changes of direction at comparatively slight angles. Thus, scouts who have tried to find the camp of the writer's troop, by a trial involving three or four more or less abrupt, and other lesser changes of direction, have gone quite far to the north, south, or west of it—the approach being from the southwest.

Fortunately, the wooded area in which those wanderings have occurred is comparatively small (about two miles long by a mile broad), so that it would be practically impossible to become lost therein with serious consequences. But it is certain that one whose sense of direction becomes so utterly confused by a few turns in comparatively open woods, would speedily become hopelessly lost in a real forest.

The point, however, is that in these instances the scouts have gone astray chiefly—as the writer believes—because of their crude sense of direction created by the right-angle plan

of city street lines. If this theory be sound, it would follow that the average of efficiency in this phase of woodcraft should be higher among country scouts than among city scouts, because the country boy's environment and customary routes are less likely to involve merely right angles and straight lines.

The tendency of the person who has entirely lost his sense of direction, to "circle," is well known and has been repeatedly proved by experiment. Indeed, it is probably true that no man can walk in a perfectly straight line without the assistance of at least one of his physical senses, and of these sight is of course the most important. Several years ago the writer saw the experiment tried on about a dozen men, who were blindfolded, and then told to walk straight ahead in as nearly a straight line as possible. Their trails were all plainly marked in a light fall of snow, and all of them showed more or less curve. The curve was not pronounced in some instances until the walker had proceeded fifty or sixty yards (the exact figures are not recalled), but soon or later it began to develop. Moreover, in all but a few instances the drift was more or less pronouncedly to the *right*, which, the writer believes, has been shown to be the case whenever similar experiments or investigations have been conducted carefully.

The most plausible reason for this circling is that it is due to the unequal strength of the two sides of the body. That is, if the right side be stronger than the left—which usually is the case—longer strides will normally be taken with the right leg than with the left, and this will cause circling to the right. The circling seems always to occur when one becomes hopelessly lost, and is likely to continue until the victim drops from sheer exhaustion. One instance on record is that of a lost man who after walking steadily for six days and nights finally stumbled into a camp only about six miles from his starting-point. Five miles of travel in a straight line in any direction from that point would have brought him out of the woods, and incidentally would have saved

him the loss of his feet, both of which were so badly frozen that their amputation was necessary.

Traveling by landmarks, or by compass, are the only sure ways to avoid circling. Landmarks should be observed carefully and frequently, for as one proceeds they are likely to change their appearance, sometimes very considerably. This applies especially to mountains or hills whose upper slopes show many crags or bowlders, the outlines of which may differ from different viewpoints so radically as to transform almost completely the appearance which they presented when they were first observed.

The usefulness of the compass to the lost man is, of course, very great, provided he employs it intelligently. And part of that intelligence will be shown by *absolute confidence* in the instrument, for the present purposes. "Magnetic variation," that is, the difference between the magnetic north, as shown by the compass, and true north, may be disregarded for ordinary pathfinding in the woods, as the deflection is not sufficient to throw the traveler seriously off his desired course. But beware of *local* attraction, such as might be established if the compass were held near any iron or steel object, like an ax or a knife or a belt buckle. To make sure that the needle is not being affected in this way, put the compass on the ground and then hold it in your hand, and note whether the needle keeps its position in both places. Very rarely a compass may be affected by a mass of iron ore beneath the surface of the ground.

It is a good plan to carry constantly a map of the country which one intends to traverse, or of the region about his camp. This map should be on a scale sufficient to show the main topographic features, in no more detail, however, than is needed to indicate, in a general way, their dimensions and most conspicuous physical characteristics. The streams should be shown with especial care. Such a map may ordinarily be found in the possession of the government official usually

the custodian of such documents, and who probably will be willing to let you make a tracing of it. This tracing should be made on tracing linen with India ink or an indelible pencil. Paper of any kind is almost certain to become creased with repeated folding, so that presently the map will be in several sections, one or more of which is likely to be lost.

Finally—"Keep Your Eyes Open, and Your Shirt on"

In so far as there can be anything like an actual preventive for getting lost, or a way of getting out of that predicament, the above heading about covers the subject. The writer has often been surprised by the evidences of an almost utter lack of the observational power in scouts when they are traveling in the woods. Others as plainly have and exercise it, more or less effectually. These conditions are likely to reflect pretty accurately the attitude and the efficiency—in this particular respect—of the scoutmasters concerned. Like breeds like here as elsewhere.

Of course, this ignorance of the woods is lamentable merely on the score that it makes being in them a matter of no particular significance or interest. But from the point of view of the pathfinder, ignorance of this kind is a serious matter. In the predicament of being lost, the boy or man with an undeveloped faculty of observation, is at a distinct disadvantage as compared with the one who can read at least part of the interesting stories which are constantly being put before him. The one will remember nothing, because really he has *seen* nothing. The other will have seen and heard understandingly many, many things. Of those he is likely to recall a few, at least—that curious case of vine strangulation; the bowlder apparently split by the growth of the roots of the big oak towering above it; the brown flash of the mink as he plunged into the brush; the insects cross-fertilizing the violets; the rumpus raised by the crows who had found an owl in a hollow

tree; the chorus of sweet-voiced toads in the puddle; or perhaps the majestic soaring of the eagle, upward and upward, until he had vanished in his wonderful world of blue, bound for the throne of Jove.

Of such observations some are almost certain to be remembered, and with such recollections are likely to be associated ideas of time and place; whereas the mind of the unobservant person is apt to be an entire blank as far as such impressions are concerned.

Perhaps no more need be said in exposition of the necessity of observing the precept expressed by that eloquent, if somewhat indelicate slang injunction, "Keep your shirt on." It is said that the poor wretch who gets lost in the Australian desert, and becomes stark mad from thirst, usually takes his boots off and throws them away. After that he always runs until he falls dead. At least, he is always dead when he is found. "Keep your shirt on" is, of course, not proposed in any such sense, though it is a fact, we believe, that lost men have been known to tear off almost all of their clothing.

But if one keeps cool and acts rationally, there is little danger that he will lose either his mental or his physical shirt. Of the two losses, the former is by far the more serious, for once bereft of his reason, the case is hopeless. There is no use denying that this is a real danger, but on the other hand it is one which easily may be and usually is averted.

Do not look for wrong and evil—
You will find them if you do;
As you measure for your neighbor
He will measure back to you.
Look for goodness, look for gladness—
You will meet them all the while;
If you bring a smiling visage
To the glass, you meet a smile.

SIGNS, SYMBOLS, AND SIGNALING *

By DANIEL CARTER BEARD

National Scout Commissioner

Trail Marks

WHEN America was first discovered there was a blanket of forest extending from the Atlantic Ocean to the Mississippi River, with the exception of a few prairies in Indiana and Illinois. This whole section of the country was one dense, dark, gloomy forest. It was traversed by traces which we now call trails. These traces were first made by the big game animals, then followed by the Indians, then by the pioneer trappers and explorers, then by the settlers with their pack-horses; after them came the wagons, and now the same trails are traveled by us all in the cars of the railway companies.

You can readily see that in a forest a man would use some method of marking a trace or trail, not only that he could find his way back, but that another fellow might follow him. This the woodsmen did by blazing the trees, that is, by chopping a piece of bark from a tree every once in a while as they traveled, so as to mark a path.

There are two kinds of blazed trails. The spot trail has the blaze made on the face of the tree so that you may see the blaze on the next tree in advance along the trail which he is following. Then there is the other method of blazing a tree on

* From "Signs, Signals, and Symbols," by Daniel Carter Beard; published by J. B. Lippincott Company; © by Beatrice Alice Beard; used by special arrangement with the author.

the side so that you may strike it easily with an ax or hatchet as you walk by. In the far North I have seen these blazed trails fifteen feet above the ground; that is because the snows are from six to twelve feet on a level in the Winter and that is when the Indians use this blazed trail. The surveyors blaze a trail along the line of a survey, cutting a piece of bark on that side of the tree along which the line passes, and when the line hits the center of the tree they mark it with three or more cuts and it is known as a line tree.

A forester in making a new trail blazes the trees as already described, but if he finds that he has made a false trail he retraces his steps to the right one, then starts afresh and marks the first two, three, or four trees with two notches so as to let you know that these are the right trees, then if you wander away on the false trail, you backtrail to the notches and start again in the right direction.

In the towns, villages, and country, the boy scouts mark the trails by chalk marks. Not only can they mark a trail thus, but they can convey information to those following them. Bad dog (Fig. 1). Danger is shown by a rectangle with a round dot in the center (Fig. 2).

When you are walking through the woods note everything. For instance, a pebble in your path shows the damp side up. It only takes a little common sense for you to reason that something has been along there before you and knocked that pebble over with its foot, otherwise the moist side would not be on top. If in a muddy place you find the track of a boy and the mud which is splattered nearby is still wet, you know that that boy has been there recently. If the mud is dry, then some time has elapsed since the boy passed that way. If the grass and leaves of a small bush are brushed the wrong way, showing the under side of leaves or grasses, you will know that something has been along there before you.

Really, boys, trailing is applying Sherlock Holmes's methods to the woods; it is using observation, noting what you see

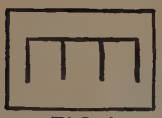


FIG. 1

FIG. 2

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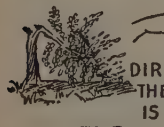

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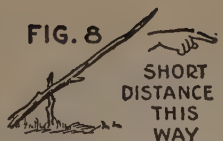

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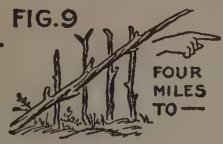

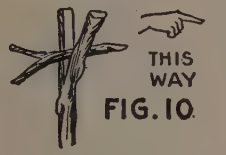

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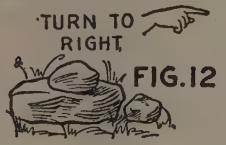

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FIG. 13

FIG. 14

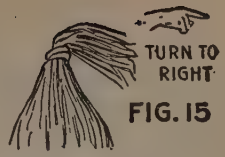


FIG. 15

FIG. 16

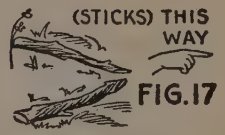
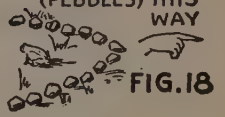


FIG. 17



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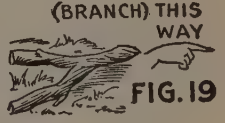

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FIG. 20

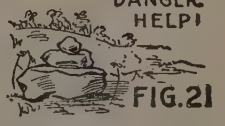


FIG. 21

Note: Figures 3, 4 and 5 represent methods used on the frontier where wood is nearly valueless. They should not be used by scouts generally, as they injure the trees.

around you, and then reasoning out the cause. The more you know about nature the easier it is to decipher a trail. For instance, if you see by the leaves or grass that some animal has passed, and note high up on a tree some animal's hair, even a chump would know that that animal was a large animal and had hair on it. But it takes a woodsman to know what sort of an animal it was, because only woodsmen are familiar with the hair of the wild animals; it might have been a moose, it might have been a deer, or it might have been a bear. If the hair on a tree is low down on the trunk, the first guess would be that it was from a small animal. It may have been a rabbit, raccoon, mink, dog, or cat. The more you know about a mink, the more you know about muskrats, wildcats, and bears, the better able you will be to read these signs. There is no royal road to trailing. You must visit the woods, hit the trails, follow them out, and reason them out to become an expert trailer.

Take the Whiffle Poof and experiment with trailing. Next you can try following your dog or anybody's dog. If you can follow a dog, you can follow a wolf. If you can follow a wolf, you can follow a fox, although a fox, as a rule, will try to lead you astray. If you can follow a cow, you can follow a moose. If you can follow a sheep, you can follow a deer, that is, all other things being equal. I do not intend to say that if you can follow a sheep's tracks in the snow or on a dusty road, that you can follow a deer's tracks in the summer woods; but experiment on domestic animals and graduate on wild animals.

In wintertime nothing can move on the ground without leaving a telltale trail in the snow. That is the time you can find more joy in working out the problem than at any other time of the year.

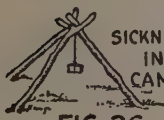
While writing this I took a trip to Pike County, Pennsylvania. The snow was waist deep in the woods, but packed so tightly that animals as large as a lynx could walk over it without sinking, leaving their tracks very distinctly upon

FIG. 22

FIG. 23

FIG. 24

FIG. 25



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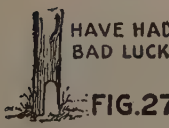

FIG. 27

FIG. 28

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FIG. 30

FIG. 31 FRESH WATER

FIG. 33

FIG. 34

FIG. 35

FIG. 36

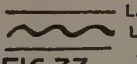
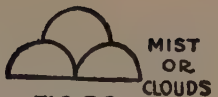


FIG. 37

FIG. 38



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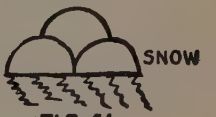

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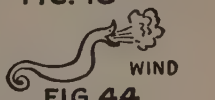

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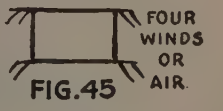

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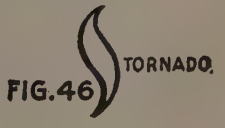


FIG. 46

the surface. My camp is 116 miles from New York City, yet in driving down from my log house to the railroad station, a distance of four and a half miles, I saw one live deer, the fresh tracks of four others, the tracks of one Canadian lynx, two mink, one raccoon, one porcupine, numerous Molly Cottontails' tracks, four or five different tracks of the big white hare, innumerable fox tracks, ruffed grouse tracks, and hundreds of tracks of different field mice which could not be identified from our position in the sleigh. I tell this to show the reader how many tracks may be found within a short distance of one of the largest cities in the world.

Some of the mice and rats not only leave a trail of their feet but also a trail of their tails. Brother Fox will trot along the road and suddenly his trail will cease. Apparently he has taken wings and flown away, but he has really jumped, doubled up his track, and commenced again. He might not know that you are following his track, but he always suspects that someone is. He comes to the muskrat house, he wants to examine it. He goes around it in two or three circles, first to be sure that there are no trenches or 42-centimeter guns hidden around or behind the muskrat house. Brother Fox is always suspicious and makes a fine trail to follow. Real animals make real tracks which are always accurate. Go to nature and study them.

Signs of Alarm, Danger, and Trouble

It is of vital importance to the whole outdoor world that a uniform system of signals should be adopted and understood to mean trouble or disaster and a call for help. Owing to the fact that some writers have, through misapprehension or typographical error, given two shots as a call for help, it has put a dangerous confusion of ideas in many amateurs' minds. It should be recognized among all outdoor people, including

hunters, explorers, military men, and boy scouts that THREE of anything stands for something serious, for a call for help, for a sign of danger. THREE might be called the Paul Revere among the signs, spreading and giving the alarm. Two shots from a gun, for instance, may simply mean that a man has fired the right and left barrel of a shotgun, but three shots in succession would attract any hunter's or sportsman's attention, and if the three shots were again repeated in the same manner he would know that someone was in trouble.

There are also statements in print that three stones one on top of the other, three tufts of grass, and three blazes on a tree, are signs of danger or alarm, which is true enough, but confusion is made when three smokes are given as a sign for good news and two smokes for "I am lost, help!" Three of everything does, and must, have the same general meaning, a cry for succor, help, or alarm—the white man's custom of firing three shots as a call for help, the Apache's custom of three smokes as a sign of alarm, the mountaineer's custom of three stones one on top of another, also the three blazes on a tree, three tufts of grass, three short blasts on a steamboat whistle, full speed astern—all indicate trouble; consequently in this system of signs I have taken the liberty to ignore any apparent exceptions to the rule.

Whistle Signals

1. One long blast means "Silence," "Attention," "Look out for my next signal." Also used in approaching a station.

2. Two short blasts mean "All right."

3. A succession of long, slow blasts means "Go out," "Get farther away," or "Advance," "Extend," "Scatter."

4. A succession of short, sharp blasts means "Rally," "Come together," "Close in."

5. Three short blasts, followed by one long one from the scout-master, calls up the patrol leaders—*i. e.*, "Leaders, come here."

6. Three long blasts mean "Danger," "Alarm," "Look out."

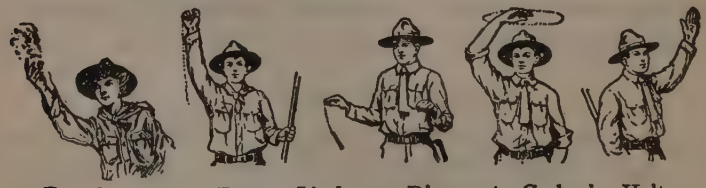
7. A succession of alternating long and sharp blasts means "Mess call," "Grub."

Any whistle signal should be instantly obeyed at the double—as fast as you can—no matter what other job you may be doing at the time.

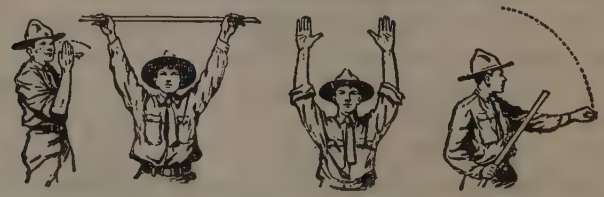
Gesture Signals

Something is lost and a scout is sent back for it. He picks up a handful of dust or other material and throws it in the air. This means "I have found it."

Doubled fist of right hand moved vigorously up and down above the head is the command to move faster. Two hands extended in front of the body, arms bent, elbows at side of body, hands motioned downward by moving the forearm from the elbow is the command to lie down or dismount. Hand whirled around above the head in a horizontal position is the command to go back. Hand held up, palm out, is the command to halt. Palm of hand toward the front of the face, all fingers spread, hand moved from right to left a few inches in

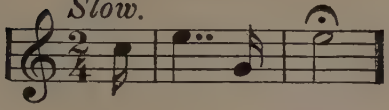


Found More or Faster Lie down or Dismount Go back Halt

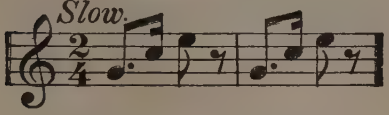


What do you see? I see Nothing to fear Advance

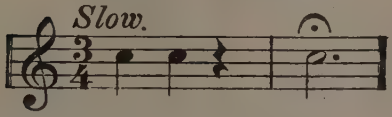
ATTENTION



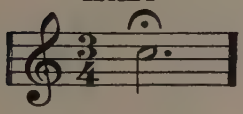
ATTENTION TO ORDERS.



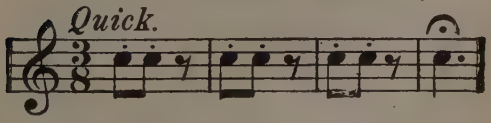
FORWARD. MARCH.



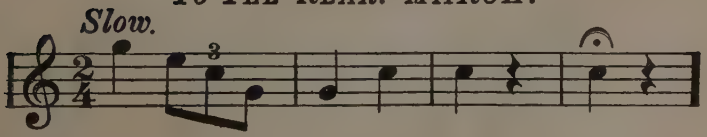
HALT



DOUBLE TIME. MARCH.



TO THE REAR. MARCH.



front of the eyes is the question: "What do you see?" Stick, staff, gun, or fishrod held horizontally by the two hands above the head tells the observer that what they are looking for is in sight. Both hands extended above the head with the palms to the front means that you have nothing to fear. Doubled fist, arm extended above the head, then brought down to a level with the shoulder, fist extended full length of the arm in front is the command to advance.

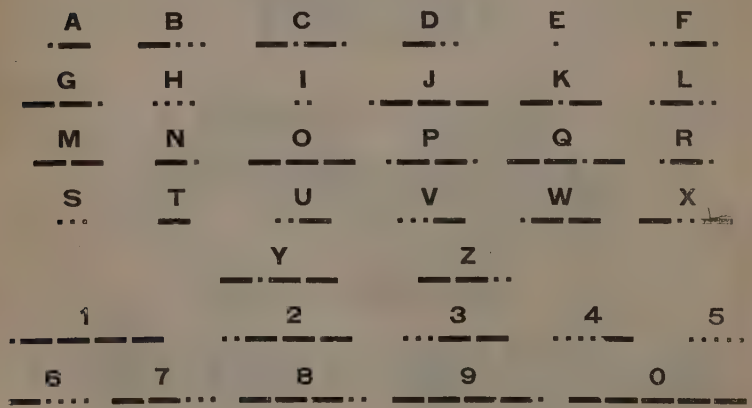
Signaling

Codes Used in Scouting

The second-class scout tests require a scout to know the Semaphore or the General Service Code. It is suggested that all boys learn both codes.

All boys should have a knowledge of the theory of signaling, of the alphabet, numerals, and conventional signals.

GENERAL SERVICE CODE



A real live boy should be able to send and receive a message at the rate of sixteen letters per minute if he uses the General

Service Code, or thirty letters per minute if he uses the Semaphore Code. He should know the alphabet, numerals, and conventional signals so thoroughly that he can be depended upon in an emergency to send or receive a message either by Semaphore or the General Service Code.

The General Service Code, known also as the International Morse and the Continental Code, is used in commercial wireless transmissions, between the Army and Navy, and for general signaling.

Boys should thoroughly master these two standard codes before taking up any others.

The General Service Code is the most generally applicable and the most widely used code. The equipment is also within reach of all boys so far as expense is concerned. It can be used with hand flags by day, and with torches, lanterns, and flashlights by night. It is used with the heliograph—an instrument for flashing the sun's rays at desired intervals and with searchlights. It can be given by whistle, drum, or bugle, and it is universally used for wireless telegraphy, and, except in this country, on the telegraph lines. It is the code used in the Ardois system explained on page 142. For these reasons it is by far the most important for the scout to know.

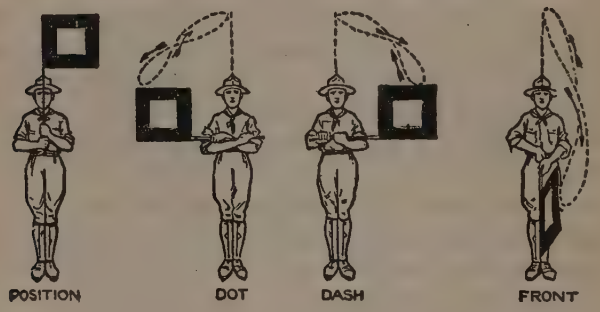
Single Flag or Wigwag Signaling

For the flag used with the General Service Code there is one position and there are three motions. The position is with the flag held vertically, the signalman facing directly toward the station with which it is desired to communicate. The first motion (the dot) is to the right of the sender, and will embrace an arc of ninety degrees, starting with the vertical and returning to it, and will be made in a plane at right angles to the line connecting the two stations. The second motion (the dash) is a similar motion to the left of the sender. The third motion (front) is downward directly in front of the sender and instantly returned upward to the first position.

One front indicates the end of a word, two fronts, the end of a sentence, three fronts, the end of a message.

In sending the message by hand flag, place yourself in such a position that the observer can see the flag clearly. Avoid standing in shadow or in such a position that the flag will appear the same color as the background.

The inexperienced sender is often unable to make his signals understood by the receiving station due to the fouling of the flag on the staff. This occurs when the sender tries to swing the flag down and back in the same line. The correct motion is to make the end of the staff describe a loop or figure eight,



so that the flag on the upstroke follows a path about four inches toward the wind from its path on the downstroke.

When the wind is blowing from either side, sending is of course difficult, but the experienced signaler makes the most of even this condition by facing slightly into or away from the breeze in a manner that will enable him to give the receiving station the greatest possible sight of the full fly of the sending flag. The flag at all times should be swung in a quiet, easy manner, avoiding jerk and whipping. Too much speed to start with will soon tire the signaler and result in poor signals.

Make signals with regularity; do not send one word rapidly, the next slowly; adopt such a rate of speed as can be read by

the distant signaler without causing him to "break" frequently. Remember that it is easier to send than to receive, and the natural tendency is to send too fast. Make a distinct pause between letters. The motion, in using the flag, should be such as to display in the lateral waves the whole surface of the flag toward the point of observation.

When possible there should be three boys in each signal party; one holding the flag to do the sending; one with field glasses to receive, and one with pad and pencil to record the message. In sending, the recording scout or scribe should call off the words, one by one, to the sender. In receiving, the scout with the glasses should call off each letter and front motion as it is received, and these should be taken down by the recording scout.

The boy should know the alphabet so thoroughly that he does not have to think of the code.

Rapidity is secondary to accuracy. Every letter should be made distinct and with easy rhythm.

Get so far away that it is not possible to call back and forth, or run easily. Send real messages of ten words or more.

Never pass between scout signaling and station while he is signaling. Don't talk to scout reading.

To select a visual station, choose a point perfectly in view of the communicating station; fix the exact position in which the flagman is to stand, so arranged, if possible, that when viewed from the communicating station he will have behind him a background of the same color for every position in which the signals may be shown.

To determine the color of the background, first ascertain whether the communicating station is higher, lower, or level with your own. If it be higher, the background for your signals, viewed thence, will be the color of the field, woods, etc., behind and lower than your flagman. If it be lower, your background will be the color of the ground, etc., behind and lying higher than your flagman. If the stations are of

equal elevation, then the background for your signals will be that directly behind the flagman.

The color of the flag must contrast as strongly as possible with that of the background. With green or dark or with earth-covered background, the white flag should be used.

If a signal station asks another to move its station either to its right or left, so that its signal will be more distinct, each station will see that a signalman holds a flag or lighted torch above his head. The station asking for the change will lower its flag immediately upon the distant station arriving at a position with a good background.

When several messages are to be sent in succession "End of message" signal will be made after the signature of each, to be followed by the abbreviation "ahr," meaning "another," after which commence with the next message.

No message will be considered sent until its receipt has been acknowledged by the receiving station.

When a station has sent all messages on hand, the signal "Cease signaling" should invariably be made. When nothing more is to be sent from either station, both will make "Cease signaling."

Visual Signaling in General

The General Service Code is used also with the following methods of signaling:

(a) By torch, hand lantern, or beam of searchlight (without shutter).

(b) By heliograph, flash lantern, or searchlight (with shutter).

(c) By Ardois.

The conventional signals on following page are the authorized standards of the United States Signal Service.

The beam of the searchlight, though ordinarily used with a shutter like the heliograph, may be used for long-distance signaling, when no shutter is suitable or available, in a similar

manner to the flag or torch, the first position being a vertical one. A movement of the beam ninety degrees to the right of the sender indicates a dot, a similar movement to the left indicates a dash; the beam is lowered vertically for front.

CONVENTIONAL VISUAL SIGNALS

(Including Semaphore)

Go ahead	BR —.....—	Separation	BT —...—
Move to your right	MR —..—.	End of word	Interval
Move to your left	ML —.—..	End of sentence	Interval Interval
Move up	MU —..——	End of message	AR .—.—
Move down	MD —.—..	Am closing station	CL —.—..—..
Understood	SN ...—(or single dot)	Send slower	QRS —.—.—....
Wait	AS .—...	Poor spacing	QSC —.—..—.—.
Repeat or error	UD (?) ..——..	Nothing for you	QRU —.—.—..—
From	FM ..—.——	Signals not plainly visible	QRZ —.—.—.—..

PUNCTUATION

(International Morse)

Period	.. .. ..	Dollar mark	—...—..
Comma	.—.—.—	Exclamation	—.—.——
Interrogation	..——..	Apostrophe	.————.
Hyphen	—....—	Semicolon	—.—.—.
Dash	—....—	Colon	———...
Parenthesis (begin)	—.——.—	Bar indicating fraction	—..—.
Parenthesis (end)	—.——.—	Underline (begin)	..——.—
Quotation marks (begin)	.—..—.	Underline (end)	..——.—
Quotation marks (end)	.—..—.		

To use the torch or hand lantern, a footlight must be employed as a point of reference to the motion. The lantern is most conveniently swung out upward to the right of the footlight for a dot, to the left for a dash, and raised vertically for front.

To call when using the searchlight without shutter, throw the beam in a vertical position and move it through an arc eighteen degrees in a plane at right angles to the line

connecting the two stations until acknowledged; a similar procedure is employed with the torch or hand lantern.

Special Methods of Signaling

Signaling by Two-Arm Semaphore

Signals may be transmitted by the two-arm semaphore. With the machine, a third arm or "indicator" is displayed on the right of the sender, the left as viewed by the receiver. At night a red light screened to the rear indicates the direction of sending.

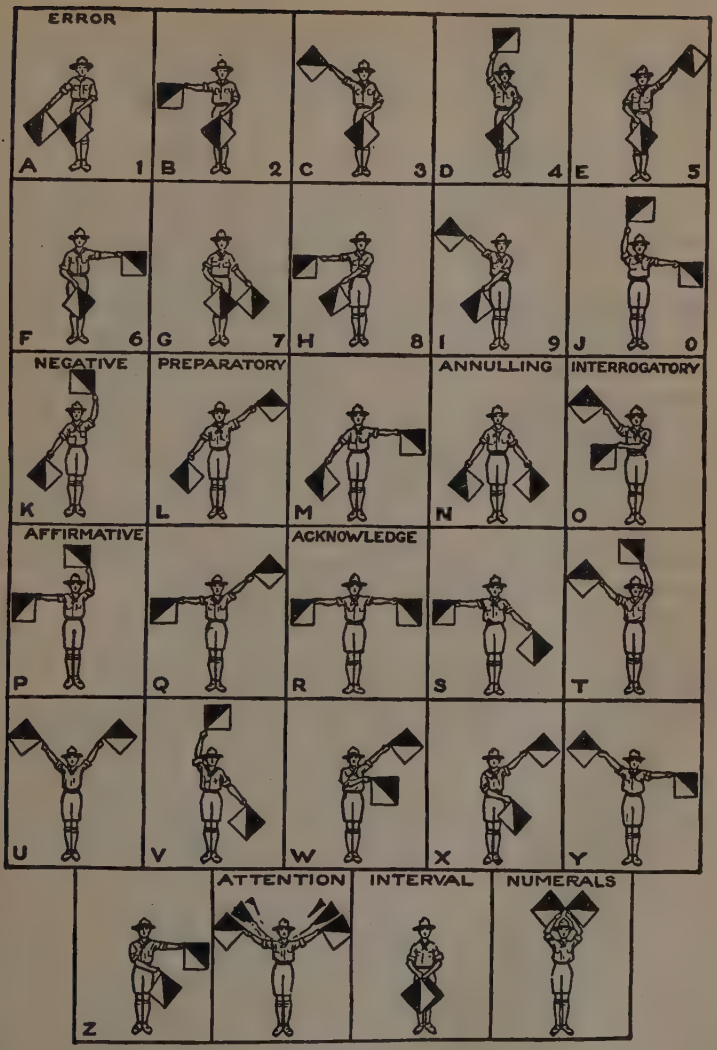
The machine will be mounted at some available point so situated that it may be seen through the greatest arc of the horizon. By means of electric lights installed on the vanes, the machine is made available for night as well as for day signaling. The vanes of the semaphore machine should be painted yellow.

Signaling by the two-arm semaphore is the most rapid method of sending spelled-out messages. It is, however, very liable to error if the motions are slurred over or run together in an attempt to make speed. Both arms should move rapidly and simultaneously, but there should be a perceptible pause at the end of each letter before making the movements for the next letter. Rapidity is secondary to accuracy.

Conventional Signals

With the machine, the interval "end of word" is the machine closed, but with the indicator showing; end of the sentence is the "chop-chop" signal, both arms being placed at the right horizontal and then moved up and down in a cutting motion, the indicator being displayed; the end of the message is indicated by the closing of both arms and indicator.

To call a station, wave the arms toward the vertical, making the call at frequent intervals. The station called answers by making its own call. With the machine, this call is left



Two-Arm Semaphore Code

with the display fixed until the message has been received and understood. When the sender makes "end of message" the receiver, if message is understood, extends the arms horizontally and waves them until the sender does the same.

Signaling by Flags with Two-Arm Semaphore Code

Hand flags, on account of their small range, are of limited application, and are chiefly serviceable for use within organizations, within fixed positions, or for incidental signaling. The range with flags of the usual size is of course dependent upon light and background, but is seldom more than one mile with the naked eye. This system of signaling has been highly developed and on account of its rapidity and simplicity should be familiar to all scouts. It is limited to visual signaling work and not adapted to general signaling as is the General Service Code. It will be found useful under many circumstances, and is adapted to special work when rapid communication for short distances is needed. This method is also used to advantage for interior signaling.

The Semaphore hand flags for service use are eighteen inches square divided diagonally into two parts, one of red and the other white; the staffs are twenty-four inches long.

Hand flags are used in the same manner as the Semaphore machine, except that in making the interval the flags are crossed downward in front of the body (just above the knees); end of message is three successive "chop-chop" signals, and withdrawing the flag from view. In calling a station face it squarely and make its call. If there is no immediate reply, wave the flags over the head to attract attention, making the call at frequent intervals. When the sender makes "end of message," the receiver, if message is understood, extends the flags horizontally and waves them until the sender does the same, when both leave their stations. Care must be taken with hand flags to hold the staffs so as to form a prolongation of the arms.

Hints

A to D: Left arm at "Interval," right arm progresses upward.

E to G: Right arm at "Interval," left arm progresses downward.

A to G: Complete series one arm at "Interval."

K to N: Right arm inclined forty-five degrees downward, left arm progresses downward.

P to S: Right arm horizontal, left arm progresses downward.

H, I, and O: Left arm crosses the body.

W, X, and Z: Right arm crosses the body.

Opposite letters: A and G, B and F, C and E, H and Z, I and X, J and P, K and V, O and W, M and S, and Q and Y.

"Numerals" precede every combination of numbers. After interval is made letters recur without further indication.

Flag Signals by Permanent Hoist

International Flag Code

The term "flag signals" or "flag code signals," as used upon the sea, applies to signals made by hoists of flags, and should not be confused with the use of the expression to indicate what is known as wigwag signals.

The International Code of Signals consists of twenty-six flags—one for each letter of the alphabet—and a code pennant. The flags are used in connection with the International Code Book of Signals. Explanation for the proper use of this code is given in the Code Book. Sets of International Code Flags, the International Code of Signals, and the Code List of American Vessels will be issued by the Signal Corps in cases only where the application therefor is approved by proper authority. Consult your Public Library for information.

Signaling With Heliograph, Flash Lantern, or Searchlight (With Shutter)

General Service Code

The first position is to turn a steady flash on the receiving station. The signals are made by short and long flashes. Use a short flash for dot and a long, steady flash for dash. The elements of a letter should be slightly longer than in sound signals.

To call a station make its call letter until acknowledged.

If the call letter of a station be unknown, signal A until acknowledged. Each station will then turn a steady flash and adjust. When the adjustment is satisfactory to the called station, it will cut off its flash, and the calling station will proceed with its message.

If the receiver sees that the sender's mirror or light needs adjustment, he will turn on a steady flash until answered by a steady flash. When the adjustment is satisfactory the receiver will cut off his flash and the sender will resume his message.

To break the sending station for other purposes, turn on a steady flash.

When it is desired to use one of the conventional signals in the interrogative sense, it must be followed by the signal of interrogation. Thus Q R Q alone means "Send faster," but when followed by the interrogation means "Shall I send faster?"

The Ardois System

The Ardois system is a display of four lights, usually electric, swinging from a staff, mast, or yard. These lights are manipulated by a keyboard placed at the station and marked with the appropriate signal letters or signs. The red lamp indicates a dot and the white lamp a dash. Four lamps are placed on a vertical staff and electrically illuminated to indicate dots and dashes which represent the letters of the

alphabet. For instace, red-white, or dot-dash, represents the letter A, and white-red-red-red, or dash-dot-dot-dot, represents the letter B.

The lights are placed vertically and read from the top downward.

When the lamps are placed horizontally, they are read from the sender's right to his left, and consequently from the receiver's left to his right.

For numerals in the Ardois system secondary meanings (as numerals) have been assigned to the last ten letters, Q being 1, R being 2, and so on, Z being 0. When communicating with vessels, the numerals of the International Morse Code must be spelled out in full.

When the letters of the alphabet are to be used to indicate the meaning set opposite them in the following tabulation, the upper light of the display is pulsated. This is effected by means of a special pulsating key.

In signaling by the Ardois system the Cornet W W W W is a general call to attention. A station desiring to exchange signals will display the call letters of the station wanted, which will be answered by a similar display from the station called, or from each station successively called.

If the call letters of a station be unknown, display the Cornet.

If it becomes necessary to put a signal message into cipher, the marking of the Ardois keyboard is on no account to be changed to accomplish this object.

Things to Remember When Signaling

General Service Code

Each signal station will have its call, consisting of one or two letters, as Philadelphia, P; and each operator or signalist will also have his personal signal of one or two letters, as Jones, "Jo." These, being once adopted, will not be changed without due authority.

COL I	COL II	COL III	COL IV	COL V	COL VI	COL VII	COL VIII
CHARACTER	INTERNATIONAL OR CONTINENTAL MORSE — WIG-WAG Sound. Flash. Sight. Wireless	AMERICAN MORSE — Land Telegraph Code.	ARDOIS SYSTEM OF LIGHTS — Same as Col II ● Red = Dot ○ White = Dash	TWO ARM SEMAPHORE — MACHINE	TWO ARM SEMAPHORE — HAND FLAGS	INTERNATIONAL CODE OF SIGNAL FLAGS (MARINE) White. Black. Red. Blue. Yellow.	SECONDARY MEANING — Refer to Column indicated.
A	•—	•—	●○				Numeral 1 Cols V, VI.
B	—•••	—•••	●○○○				Numeral 2 Col VI.
C	—•—•	•• •	●○●○				Numeral 3 Col VI.
D	—••	—••	●○○				Numeral 4 Col VI.
E	•	•	●				Numeral 5 Col VI.
F	••—•	•—•	●●○●				Numeral 6 Col VI.
G	——•	——•	○●●				Numeral 7 Col VI.
H	••••	••••	●●●●				Numeral 8 Col VI.
I	••	••	●●				Numeral 9 Col VI.
J	•———	——•—	●○○○				Numeral 0 Col VI.
K	—•—	—•—	●○●				
L	•—••	——	●○○●				
M	——	——	●○				

COMPARATIVE CHART OF SIGNALING SYSTEMS

COL I	COL II	COL III	COL IV	COL V	COL VI	COL VII	COL VIII
CHARACTER	INTERNATIONAL OR CONTINENTAL MORSE. WIG-WAG Sound, Flash, Sight, Wireless.	AMERICAN MORSE Land Telegraph Code.	ARDOIS SYSTEM OF LIGHTS Same as Col II ● Red = Dot ○ White = Dash	TWO ARM SEMAPHORE MACHINE	TWO ARM SEMAPHORE HAND FLAGS	INTERNATIONAL CODE OF SIGNAL FLAGS (MARINE) White ○ Black ● Red ● Blue ● Yellow ⊗	SECONDARY MEANING Refer to Column indicated.
N	▬•	▬•	●○				ANNULLING Cols V, VI
O	▬▬▬	• •	○○○				INTERROGATORY Cols V, VI
P	•▬▬•	•••••	●○○○				AFFIRMATION Cols V, VI READY TO SAIL. Col VII.
Q	▬▬•▬	••▬•	○○●○				QUARANTINE Col VII.
R	•▬•	• ••	●○○				ACKNOW-LEDGE. Cols V, VI.
S	•••	•••	●●●				I WANT A PILOT. Col VII.
T	▬	▬	○				NUMERALS GENERAL SERVICE CODE
U	••▬	••▬	●●○				1 •▬▬▬▬
V	•••▬	•••▬	●●●○				2 ••▬▬▬ 3 •••▬▬
W	•▬▬	•▬▬	●○○				4 ••••▬ 5 •••••
X	▬••▬	▬•••	●○○●				6 ▬•••• 7 ▬▬•••
Y	▬•▬▬	•• ••	○●●○				8 ▬▬▬•• 9 ▬▬▬▬•
Z	▬▬••	••• •	○○○●				0 ▬▬▬▬▬ NUMERALS FOLLOW

Numerals always preceded by "numerals follow" sign. When communicating with vessels numerals are always spelled out. Secondary meanings are the same for Col. V as for Col. VI.

To acknowledge the receipt of a message, signal "R front" with flag, torch, hand lantern, and beam of searchlight (when similarly used), or "R" with flash signals, followed by the call letter of his station and the personal signal of the receiver.

In receiving messages nothing should be taken for granted, and nothing considered as seen until it has been positively and clearly in view. Do not anticipate what will follow from signals already given. Watch the communicating station until the last signals are made, and be very certain that the signal for the end of the message has been given. In reading messages, letters should be read as a whole and not by dot and dash, which is like counting on the fingers.

In receiving a message the boy at the telescope should call out each letter as received, and not wait for the completion of a word.

In reading it is important that the boy keep his attention fixed on the distant stations. There should be at least two boys at each station, one to read or send and one to record or call off.

If a scout, one of the best ways to practise signaling for second-class scouts is to have the troop count fours, then the odd numbers step two or three paces to the front, and all face halt right to follow the best-versed scout who acts as guide and is placed three paces in front.

The patrol can now wave the alphabet in unison as called for, letter by letter, or in rotation; this makes a very pretty sight for exhibition if well done. With a larger number, distance can be taken to the front, No. 1—2—3—4 men stepping off together at two-pace intervals.

Try night signaling, using an old broom or bunch of oiled rags for a torch, or an ordinary hand lantern. In either case a footlight must be employed as a point of reference to the motions.

To use a stationary light, a lantern, or Baldwin Lamp, the hat or a piece of paper may be passed back and forth in

front of the light. A shutter of two or more pieces worked with a spring or rubber band to close it, and a button or key lever to open it, is much better and is readily constructed. Use a short flash for a dot, and always a steady flash for a dash.

Try distance signaling—see how far apart signals can be read. Too often work is done indoors where the boys call back and forth.

For further information see Signal Book, United States Army, which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Wireless Telegraphy

The General Service Code is the universal standard for wireless telegraphy.

Many scout troops have developed this to a high degree.

The following conventional signals are used by radio stations:

Distress signal (ship stations only) · · · — — — · · ·
Attention (or call). The call is composed of the attention signal — · — · — followed by the call letters of the station called, repeated three times (if unknown use C Q in place of call letters of station called), followed by D E and then the call letters of the calling station, repeated three times.
Invitation to transmit (go ahead) — · —
Signal separating preamble from address, address from text and text from signature — · · · —
End of message · — · — ·
End of work · · · — · — followed by the call letter of sending station and — · —
Received (acknowledgment of receipt of message) R followed by the call letter of the receiving station and personal signal of the receiving operator.
Here is another message — · — · — (attention call)
Understood (or I understand) · · · — · followed by the call letters of station.
Not understood (or repeat) · · — — · · (Interrogatory) and the last word received.
Error · · · · · · · ·
Wait · — · · ·
Official (government) message O F M
(First word of preamble of all radiograms) RADIO

Abbreviation	*Question*	*Answer*
Q R J	How many words have you to send?	I have —— words to send.
Q R K	How do you receive me?	I am receiving well.
Q R Q	Shall I send faster?	Send faster.
Q R S	Shall I send slower?	Send slower.
Q R T	Shall I stop sending?	Stop sending.
Q R U	Have you anything for me?	I have nothing for you.
X X	Interference	
C Q	General inquiry call (when call of station is unknown)	

The following is an example of the transmission of messages:

— · — · —		Brown 175 King	Address
RADIO		Street	
Circle City	Office of destination	Circle City	
D E		— · · · —	Break
Fairbanks	Office of origin	Arrive to-morrow	Text
2	Number of message	— · · · —	Break
L	Operator's sign	Jones	Signature
8	Check	· — · — ·	
Twelfth 4 P. M.	Date and hour of filing	K M O	
— · · · —	Break or double dash	— · —	

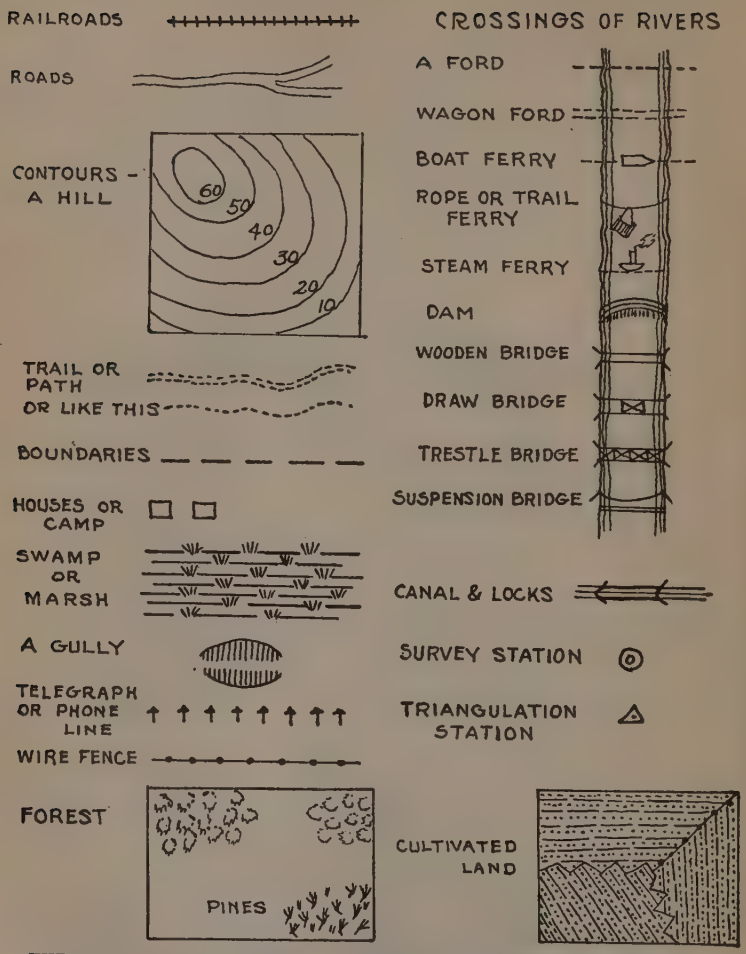
The splendor falls on castle walls
And snowy summits old in story;
The long light shakes across the lakes,
And the wild cataract leaps in glory.
Blow, bugle, blow, set the wild echoes flying,
Blow, bugle; answer, echoes, dying, dying, dying.

O hark! O hear! how thin and clear,
And thinner, clearer, farther going!
O sweet and far, from cliff and scar,
The horns of Elfland faintly blowing!
Blow, let us hear the purple glens replying:
Blow, bugle; answer, echoes, dying, dying, dying.

O love, they die in yon rich sky,
They faint on hill or field or river;
Our echoes roll from soul to soul,
And grow forever and forever!
Blow, bugle, blow, set the wild echoes flying,
And answer, echoes, answer, dying, dying, dying.

—ALFRED, LORD TENNYSON.

EXPLORING AND SURVEYING



THE COMMON MAP-MARKINGS TO INDICATE CHARACTER OF COUNTRY

WHAT IS THE ANSWER?

By PHILIP D. FAGANS

SICK, discouraged, so weak he has to be carried the last part of the way, here sits Livingstone in the heart of Africa. Suddenly there is the sound of guns and the sight of an American Flag. It is Stanley come to find him, to give him food and clothes, and to bring him back home. Will he turn back? No, he must go on and find the source of the River Nile. Stanley and he separate—Stanley to return to civilization, Livingstone to find the answer to his questions. And so he goes, till one night, alone in his tent, his soul goes out. Livingstone is dead, but his men carry his body far out to the coast and then send it to Westminster Abbey, where it is buried.

Columbus, obsessed with the idea that the earth is round and that he can find a short route to India, is ridiculed. In the face of it all he persists, equips his party, embarks on an unknown sea, and in the early morning of a fateful day, finds the shores of a new land—however, not the one he sought.

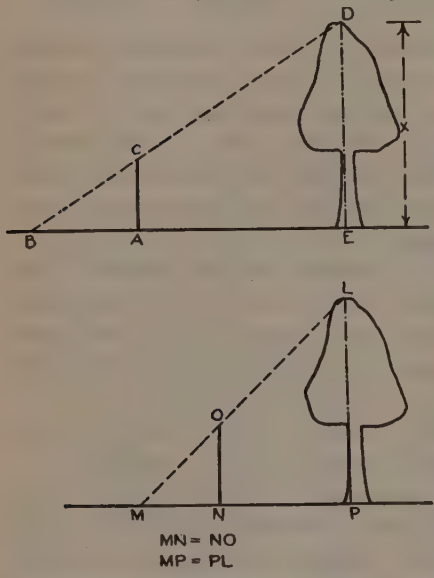
Lewis and Clark by forced marches reach the sea, to open up new lands to America. Their pay? Hard work.

We read of the men who, one after another, left their homes, comfort, and all that ordinary men hold dear; how they endured hardships, suffering, and starvation in order that they might find the truth as to a given question which loomed large in their minds. They always found an answer—but not always the particular answer that they sought.

Sometimes they even paid their lives for their answer. Then soft, comfortable people back home said they were

silly, foolish adventurers. But the explorer has always opened up new lands and found new facts which later were for the good of the human race.

So long as the blood runs warm at the tales of Scott in his search for the South Pole, and those of Peary for the North, so long as we hear with pride how strong men gave their food to the weak, and how men ignore cold, hunger, and sickness and die for an idea, just so long will we know that men are men and that all the refinements of civilization have not weakened us.



When I hear Wallace tell of his expeditions to Labrador, or Cherrie of that trip to South America with Roosevelt, I wish that I might go on such a trip and stand on land where a white man has never stood before.

Perhaps none of us will ever have that privilege. What then? Well, while we are waiting let us be getting ready by exploring the country round our home, even though we live in the heart of a great city. You would think it very strange if you found a boy living in the woods who did not know the country, who could not tell you what was to be found in the woods near his home.

What of the boy who lives in the city but does not know what is to be found of interest near his home? Several years ago I ran a Treasure Hunt for some boys in New York City. As the first part of the hunt I asked each boy to find

a tree of a given kind within two blocks of a certain building. I thought I was giving them something hard, but, in the next day or two, four boys found not merely one tree, but three others like it.

While getting ready for that trip that I may never take, I like to go into the woods in the early Spring before others have been there and see what wild flowers have come up, or what strange thing I can find to take home and look up in my library in order that I may know all about it the next time we meet.

When morning comes after the storm, I like to go down to the shore to see what the waves brought up in the night. When the tide goes out, it invariably uncovers all sorts of wonderful things for me.

Even as I go to the train I like to make a quick exploration trip of the hedges to see if there are any new cocoons or if I may perchance find the egg sacs of spiders. I am always pleased on a foggy morning to see the many spider webs stand out in the morning mist like designs of water pearls.

When Spring comes, the walk to the station is different each day—always full of surprises. New flowers appear, and old bird acquaintances come back, and I gladly renew the acquaintance with them one by one.

There are many new worlds to be explored—who will be the explorer

Did you ever hear Ernest Thompson Seton tell the story of the "King of the Bugs of Battersea?"

A shoe clerk, tired out after a hard week's work, was resting one hot Summer Sunday afternoon on the grass in Battersea Park, in the center of a congested section of London. Idly lying there in the sun, he felt a bug crawling across his hand and as he glanced down, saw its wings iridescent in the sunlight. "How beautiful," he thought, looked at the bug more closely, and finally wrapped it up in his handkerchief and took it home.

Next Sunday he was again in the park, and another bug

crawled on him. He noticed that it was different from the first, so took it home also. And thus he started to notice bugs and to collect them. Little by little he came to see that some were related and then he wanted to know their names. Seeking for information, he met a scientist who helped him find the path, so that eventually he made a wonderful collection of bugs gathered in Battersea Park, a collection in fact, which commanded the attention of scientific men. Finally he was asked to speak on the subject of bugs, and was introduced to a remarkable group of men as the "King of the Bugs of Battersea." Think of the fun he had had exploring in this field no other person had entered.

In fact, every time you go to a new place for the first time alone you are exploring. You are seeing new sights and finding new facts.

If you are to come home alone, you will notice the landmarks so you can find your way. When I was a boy I remember driving the milk wagon one day for my father, who was sick. I had gone with him a number of times on the route, but apparently I hadn't fixed it in my mind very well, for I found myself "mixed." Then, shortly, I found the trail again. But the next morning several irate customers convinced me that I had lost part of the trail—a very important part to them.

An explorer must be able to find his way. Why not practice it by learning the principal buildings and other landmarks in the city in which you live? The same principle applies to the country, except that there the landmarks are trees, hills, mountains, rivers, rocks, instead of buildings. They say that city people are much more likely to become confused in the country by the gradual turns, which are common there, when they are used to the right-angle turns of city streets.

A compass is of no use in finding your way unless you know where you are in relation to some other place, that is, the general direction of the camp, or your home. As you walk through the woods or down the trail, notice the direction of the sun, in

the east in the morning and in the west in the afternoon, so that you will know the general direction you are going.

A woodsman can tell which is north by the moss on the trees, but as some trees do not count, like one that leans, it is difficult for the amateur to be sure by such methods alone.

An explorer is usually aiming at finding some particular fact. In addition, he usually makes a rough map of the country in which he finds himself and what it contains. Would you like a few stunts that would help you to know where you "are at," how high trees are, how to measure a lake when you can't get across to the other side, how to tell north and south when you have no compass? Here are a few simple stunts you can try out in the fields and woods near at home and be ready for the possible trip to a strange land.

How to Tell North and South by Your Watch

Take your watch and hold it so your hour hand points to the sun. If the sun is high and you want to be exact, or if the sun is behind a cloud, take a match, a twig, or the blade of your knife and hold it up so the shadow falls on your watch along the hour hand. When your hour hand points to the sun, half the distance between it and 12 on the watch is toward the south. For instance, at eight o'clock the halfway point between it and noon will be ten, which point is south. In the afternoon you reckon halfway back to twelve, not forward. At four o'clock, with the hour hand pointing at the sun, south would be halfway between four and twelve, or two o'clock.

If we had a watch with twenty-four numbers on it, with the hour hand pointing at the sun, due south would be at twelve. There are twenty-four hours in the day, but only twelve hours on the watch, so in order to find the south we have to go halfway between the hour hand and the twelve-hour point.

Finding Your Way by the Stars

I have always heard how the men who lived on the plains, in the woods, and on the sea, could guide their course by the

stars and, somehow or other, I got to thinking that the stars were always in the same place in the heavens. I thought I could step out of the backdoor on a starlit night and find each star exactly as it was the night before, but such a notion is a mistake, so we must learn to identify individual stars, or groups of stars, wherever we find them.

I first learned the Big Dipper and the North Star. When first I saw the Big Dipper it was acting like any respectable dipper should, its handle was up and it would have held imaginary water. But a few nights later when I looked out at a different time, it was upside down and the imaginary water had run out.

Then I learned that the dipper is always turning—just like your watch hand—only the opposite way.

The North Star is practically north all the time, but the wise men say that it is *exactly* north only twice a day; that is, when the double star, "The Papoose on the Squaw's Back," or "the Horse and Rider," are directly over and directly underneath the North Star or Polaris. An explorer must know the Pole Star. Men have found life through being able to locate it and follow it.

Get acquainted with the other stars and constellations. They will give you a great deal of pleasure and comfort. You remember that the Indian measured time by moons and suns. January was the Snow Moon; February, the Hunger Moon; March, the Awakening Moon, etc. Let the different phases of the moon come to have a meaning to you. You can easily learn to tell how late it is in the night by the position of the stars.

The Timber Cruiser

Did you ever hear of a "timber cruiser?" He goes through the forest land and is so expert that he can estimate the number, size, and value of the timber in a given space so accurately

that lumber concerns buy on his estimate and come out right. Once in a while a careless man makes a mistake, like one I ran across up in Canada several years ago. The timber cruisers must have been overoptimistic, for they estimated that there was enough lumber to keep them cutting for several years. On this estimate a firm made plans involving a million or more of dollars, put in a wonderfully complete plant, and went broke when the lumber ran out at the end of the first year. That cruiser proved to be an amateur—he couldn't measure trees.

How to Measure the Height of a Tree

You will want to be able to measure heights by your eye, and in order to develop this ability, try measuring the height of trees by either of the following methods after you have first made a guess as to how high you think the particular tree is. Here's where your geometry comes in with its angles and triangles:

Cut a pole ten feet long. Choose a smooth place some distance from the tree to be measured and stick the end in the ground. Lie down so that the eye at B is level with the tree base, and in line with the top of the pole and the spot on the tree to be measured. Drive a stake at B. Measure the distance from stake to pole—then from pole to tree. Now, if you remember proportion, you can get the height of the tree by this formula. The distance between the stake and the pole is to the height of the pole as the distance between the stake and the tree is to the height of the tree, or BA : AC :: BE : X. If you want to prove it, try this method on some object you can easily measure.

The better method, however, is told of by Kephart, in his volume on "Woodcraft," as follows: Cut a stake or pole as high as you are. Stand it in front of you, noting the level of your eye on the stake. From this point to the end sharpen the pole. Walk away from the tree a distance about the height of the tree you want to measure. Drive

the stake in the ground up to the eye mark. Lie down on your back with your feet at the stake and sight from this position along the top of the pole to the spot to be measured. If you do not get it right the first time, try again. When the eye sights a line hitting the top of the pole and the spot to be measured, mark where your head is. Measure the distance from the pole to the tree. It will equal the height of the tree.

How to Measure Distance across Water or to an Inaccessible Spot

How far is it from B on this side of the river to A on the other side. Drive a stake at B. Get three straight poles the same length and lash them together with string, or bark, or peg them together so they will make an equilateral

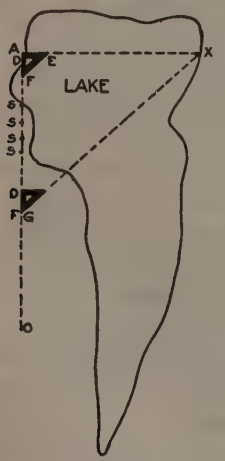


Figure 1

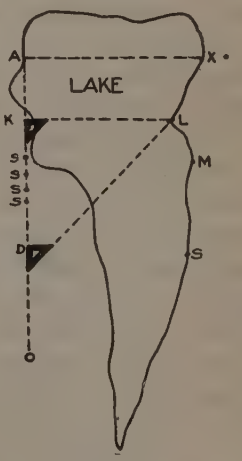


Figure 2

triangle. Take the triangle along the bank to a point C where one side of the Triangle, CD, will sight on A while the other side sights along CE to B. Put the triangle on the ground and drive stakes exactly where the three points of

the triangle are. Then go to F, so that the triangle sights along FG on A and along FE on B. The triangle ACF is an equilateral triangle and, as our geometry teacher is *always* right, the distance from A to B is equal that between C and F. Measure the latter distance and figure out how far A is from B.

How to Survey

In the early days, all the surveying done was very rough; in fact, so rough that it is hard sometimes nowadays to get the maps straight. Modern surveys are very much more accurate. We bought a house in Greater New York and, thinking it better to be safe than sorry, engaged one of the companies whose business it is to "search title" to do so for us. They did so and, of course, made a survey. As a result, they undertook to guarantee and insure us as to the accuracy of the title with the exception of a strip on one side running from one-half inch at one end to a point at the other. This, they said, they could not guarantee owing to a difference on the map as made by several surveys which differed. So you can see how fine the city surveyor of to-day is.

Here is one way of mapping a lake or country accurately.

Take some solid strips of wood, say one-half by two inches, and make an isosceles triangle of twelve by twelve by seventeen. You can make it out of solid board if it is more convenient.

Mount the triangle on a pole sharpened at one end. Put a pin at the corner D and another at E and F. See Figure 1.

Assuming you want to measure and map a lake at camp, place your staff at a point A which is in line with DE and the point X.

Then sight along DF, and have a companion drive in stakes to extend the line at s. s. s. Drive a stake with a handkerchief on it at A. Proceed up line AC, etc., to a point G. On that line where the FE side of the triangle

lines up with X, and DF lines up with the line staked out, drive a stake at G. Now, the distance from A to G will be the distance from A to X.

You can use the system further by repeating as from K to L, etc., in Figure 2.

If you take the line AG as your base line, you can continue and map out your entire adjacent country. After you have done some of such work, you may want to try surveying with simple instruments and later become a real surveyor. It is very useful information for any boy, and especially valuable to hunters, woodsmen, campers, explorers, and the like.

DAILY TRAGEDIES OF THE NORTH WOODS *

By A. W. DIMOCK

Photographs by Julian A. Dimock

I MUST have been ten years old when I began my life as a trapper. Before that I used to wander in the woods just back of my home in a little village of Massachusetts. I remember my fearsome steps through the dark recesses beneath the heavy foliage of the great close-growing pines. I walked slowly, shivering in anticipation of what I was seeking—the loud whir of the startled partridge, as the ruffed grouse was called then as now.

Soon I was following the paths of the partridge through the woods, and setting across them the old-fashioned twitch-up snares. Two sticks, an inch in diameter, are thrust firmly in the ground five or six inches apart, one on each side of the path. On the side nearer the path, seven or eight inches from the ground, a notch is cut in both and a little crossbar, five or six inches long, fitted to extend from one notch to the other. A near-by sapling is trimmed, bent

* From *Country Life in America;* used by permission.

Courtesy of Country Life

Upper—THE TRAPPER IS OFTEN ACCOMPANIED BY HIS DOG

Lower—THE ABORIGINE USUALLY USES THE SAME METHOD AS DID HIS FOREFATHERS BEFORE THE DISCOVERY OF AMERICA

Courtesy of Country Life

Upper—SETTING THE TRAP

Lower—THE TRAPPER TRAVELS ON SNOWSHOES, AND CARRIES HIS SCANTY SUPPLIES AND TRAPS ON HIS TOBOGGAN

down, and its top connected by a string to the crossbar, which is now kept from flying up in the air by the notches in which it is caught. To the crossbar a noose of fine wire, or string, is fastened and adjusted with tiny twigs inside the open space enclosed between the uprights, the crossbar, and the ground. From each of the uprights a slight fence, a foot high, made of twigs thrust into the ground, is built for any distance, from a few yards to many rods. A partridge would rather walk a mile than get over a fence a foot high. If not already in the path, when he approaches the snare, he follows the fence till he comes to the gateway which has been made for him. As he walks through, the noose falls over his neck and as it tightens, the crossbar is pulled out of the notches and the released sapling jerks the bird in the air where he hangs till the boy who set the trap calls for him.

All this is unlawful to-day, and as unmoral as to shoot a partridge in a tree or on the ground, or to kill him with an automatic gun. State laws and sportsmen's ethics are uplifting communities and teaching their youth that game was not created to be killed for fun, and that the man who murders it to sell to others, even if it is to support his family, is a degenerate whom the community should suppress.

Sometimes other things than partridges got in my snares. I caught a rabbit, occasionally and once I found my own little dog in one. His weight would have broken the string that held him, but for the elasticity of the sapling which yielded to his struggles and held his forelegs off of the ground when he rested. I often thought of him in later years, when playing a big trout with a fly rod, and a line that wouldn't have borne his weight.

When Winter came I waded through the snow in the same woods and studied the many tracks in it, from the tiny footprints of a mouse, squirrel, or cottontail rabbit, to the trail of a great white hare, so big that a cow might have made it. In the most beaten path I placed a box trap

of my own construction, but of orthodox make, of the pattern known to boys since the days of Nimrod. It was baited with a slice of apple or part of an ear of corn, and dawn often found me peering through the gloom beneath the pines to see if the trap were sprung.

If it were, I lifted the end which formed the door of the trap, just a little, and with my eyes close to the crack tried to make out what manner of beast was inside. If it were either a little rabbit or a big hare, I opened the door of the trap wide enough to allow my hand and arm to be thrust inside and soon had Bunny safely by the legs. Sometimes, instead of a rabbit, there was a flying squirrel in the trap, and occasionally a red one. These little creatures resented being handled and I put the trap on my sled and carried it home, taking it to my own room before opening it. In a few days the squirrels were tame enough to wander about the house, and after a while refused to be driven away. The hares and rabbits were colonized in the woodshed, and day by day my menagerie grew.

At first my parents applauded my success and even commented proudly upon it to the neighbors. Later they became ominously silent and after an investigating red squirrel had upset a bottle of ink on my father's desk and, having waded through a puddle of the liquid, tramped over the sheets of a sermon prepared for the following Sabbath, the outer door was opened to the mischief maker. That made little difference for, like the cat, the creature came back. The family in the woodshed grew and I was making almost daily additions to it when an incident occurred that broke up the whole business.

I visited my trap earlier than usual one morning, when it was too dark to tell with certainty what kind of creature it contained. I could see that it was too large for a squirrel and, assuming it to be a rabbit, I opened the door of the trap and seized the animal by its legs. I started hastily

for home, where I found myself *persona non grata*, although those may not have been the exact words used at the time to describe my condition. I believe my clothes were buried and I think there was a general feeling of regret that the same treatment could not be extended to me. I do remember that my father hitched up the horse and took the rest of the family to visit a parishioner at the other end of the town.

The next victim of a trap of mine, many years later, was an otter. I had seen the pretty creatures in a zoo; I had watched a family of them playing in the crystal water of a great spring which flowed out of the earth, a full grown river; and I laughed often at the fun they had coasting down the toboggan slides they built on the steep bank of a Southern river. Sometimes the round head of a wise old otter appeared on the surface of the water a few yards from my canoe. Then I sat motionless, hoping not to frighten the graceful creature, but the instant he saw me he showed his confidence in me by disappearing at once. Yet I have known otters which, after a proper introduction, became fairly fearless of me and even permitted me to pet them—a little. I knew one that had been caught very young and been brought up in a family by a human foster mother. As the creature grew it foraged for its own food and spent much of its time in the stream that flowed in front of the house of its parents by adoption. It often kept late hours, but when morning came it could always be found in the crib of the youngest member of the family, snuggled close to its human playmate.

As I wanted a pair of otters to send to the zoo, I went out with an otter hunter and we set traps near an otter slide on the bank of a river where we had seen the creatures at play. The next morning an otter was in the trap, held fast by one leg in its cruel jaws. As I approached she retreated as far as the chain on the trap would permit, then, turning upon me, prepared to defend herself with teeth and claws. If at that

moment I could have released the brave little beast, I would have done so. But an otter has the bite of a bulldog and the quickness of a cat. To get her out of the trap without killing her I held her head crushed in the mud with a forked stick until the trap was taken from her leg, after which we placed over her the box intended for her cage. Then I fitted up a larger box with a tank two feet long for her bathtub. We put little fish in the tank and she caught them with lightning quickness. The next day her foot was badly swollen and the creature plainly showed her distress. That night her pups were born and she ate them. Perhaps it was from hunger, but I have often feared that it was to save them from a captivity that had proved so cruel to her. Her leg never healed from the bite of the trap and her foot had half rotted off when the animal died a few days later. I have never since set a trap of that cruel kind and I never will.

I have followed a trapper over his line of traps. The trouble of the trapped animal is over when he reaches it. A blow or two on the head with a club which he carries ends its life. But it is not pleasant to think of the days of torture while the wretched creature strove to tear its leg from the iron jaws until the flesh was worn to the bone. Traps are often left untended for days and I have found them with dead and decayed victims clutched in their serrated jaws. Always they bore evidence of long-continued suffering and suggestion of fever, thirst, and starvation, added to that torture, which in the days of the Inquisition was called the "boot." For usually the flesh of the leg had been lacerated until the bone lay bare and often that was crushed.

A trapper complained to me of the meanness of some animals that robbed his traps by chewing off their own paws. He told me that he got around the "critters" by setting his traps in pairs, a few feet apart. He said that if an animal got his foot in one he always thrashed around until the other trap had him too. I was going the rounds with the trapper as he explained

his method and soon had an illustration of the way it worked. The next brace of traps we reached held an otter, the one by a foreleg, the other by a hind one. Doubtless the trapper's theory was sound, for though many animals will gnaw off one leg and walk away on three, I have heard of none that would eat two of its legs and travel on what were left. This vicious custom of mutilating themselves, which many of the fur-bearing animals practice, is a source of much inconvenience to trappers. They are compelled to resort to many devices to safeguard their property.

For water animals, such as the otter, muskrat, or mink, the trapper cuts and trims a sapling over which the ring on the chain of the trap will slide. The top of the sapling, which is left untrimmed that the ring may not pass over it, is thrust deep in the water near where the trap is set and the butt end made fast to a tree. When the victim springs the trap he makes for deep water, the ring slides down on the sapling, but never returns and the animal drowns before he has time to gnaw off the leg which belongs to the trapper.

For foxes and other land animals, a sapling is bent down, the ring on the chain fastened to the top, and afterward hooked under a notch in the base of another sapling. The struggle of the animal which springs the trap releases the ring, and the sapling tosses the creature in the air where it remains suspended, safe from itself or other predatory animals. Of this method there are many variants, but the substance is the same.

For bear, and often for other large animals, the trap is fastened to a clog, usually a log weighing from ten pounds to a hundred. This is to prevent the breaking of chains and traps, and the tearing off by animals of their own legs. Yet, in general, and excepting for very large animals, traps are fastened to the nearest available tree or root and without attachments of any kind. Makers of traps provide devices for catching the fur-bearers so high up on the legs that these valuable members cannot be gnawed off by their owners. In trapping, every

inducement is offered to persuade the trapped animal to die decorously, without unnecessary mutilation of his own hide.

Most trappers are of Indian blood, more or less, and are racially immune to the suggestion of suffering. Stoics themselves, their imagination is unequal to associating cruelty with animals. The Florida Seminoles trap very little, but if they did otherwise, criticism of their methods would not lie in the mouth of a people or a government which, while taking from them their lands and other means of subsistence, have given them nothing in exchange. The tribes of the West are leasing their lands for white men to work, watching their flocks and herds, cultivating their little crops, or living in squalor on the crumbs that fall from the white man's table. Few of them are hunters or trappers. In the frozen north it is different. For generations in the great Hudson Bay Company's territory trapping has been the occupation of the Indian. That company of immigrant "gentlemen adventurers" has always held the native American in a bondage that gives to the Egyptian domination of the Israelites a mild, paternal aspect.

To this day the aborigine sets his "dead-fall" as he did before we Americans had heard of America. He places one log upon another and drives two stakes on each side to hold them in line. One end of the top log is raised and held in the old figure four trap fashion, or by an equivalent device. Other stakes or logs protect the spindle or bait from being reached, excepting from between the logs, so that when the trap is sprung, the animal springing it is sure to be between the logs in a position to be advantageously squeezed to death.

Most of the trapping, however, by Indian as well as white man, is done with steel traps. When Winter comes the trapper starts out, alone, or with one of two companions, to establish one or more lines of traps, each from ten to forty miles long. He travels on snowshoes and carries his scanty clothing, meager food supply, and load of traps on his back, hauls it on his toboggan, or loads it on his dog sled. When the

mercury is frozen in the bulb, he digs a hole in the snow, arranges a few branches over it, builds a fire in front of it and with his dog huddling beside him, lives through the night and resumes his work in the morning.

He knows how to catch fish through the ice and he saves their heads and entrails to bait his traps. If he hasn't a bottle of essence of skunk and a few glands from muskrats and other animals for "medicine," he sets his traps and gets them from their natural sources. He discovers an air-hole near the mouth of a brook and finds, or makes, a resting-place for his trap just under the surface of the water, and he will tell you in advance whether it is mink or muskrat that he will take out of the trap the next morning. He notices a track leading to a hollow in a tree and sets a trap near it, scattering a few bits of fish about it and doubts not that on his return he will find a pine-martin waiting for him. We can rejoice with him in the death of this martin but for the cruelty of the method of killing him, for the little beast is a weasel, a sucker of eggs, a destroyer of birds, young and old, and a wholesale murderer of rabbits and squirrels.

When the trapper strikes the trail of a fox he becomes thoughtful, for a fox is as foxy as a man. Perhaps he sets a trap ostentatiously in the trail and another cunningly concealed a little on one side of it. He reasons that the fox, recognizing the exposed trap, will be so interested in avoiding it that he will fall into the other. But the fox can reason, too, and says to himself,

"What in thunder made that galoot set up a trap as if it were a signpost? There's a nigger in that fence!" and he takes heed to his steps. So the wise trapper hides both traps and brushes dry snow over them, leaving just a tiny bit of the one on the trail exposed as if by accident. Then he sweeps out the prints of his snowshoes with a spruce bough, puts a few feathers in the path, a little fox medicine on the trunk of a tree and drags a piece of fish or bird down the trail.

The trapper who finds himself in a beaver region is in for trouble. He sets his traps in the mud under the water of an air-hole near the beaver dam. In the morning he finds his trap sprung with a stick in its jaws. I have the assurance of an old trapper that he has known beavers to spring traps in this way. My confidence in that trapper has got so much the better of my judgment that I really believe the story, but I don't ask anyone else to. I have an animal story of my own which I am not going to tell until I can back it up by enough evidence to save my own reputation.

If it is hard to criticize the Indian for cruelty which he cannot comprehend, what can the white man say to the Indian woman who tended her line of traps with her five-day-old infant strapped upon her back? Indian trappers often preserve the taciturnity of their people, yet sometimes the blood of the race of the gentlemen adventurers comes to the surface and they act like white folks. Jean Baptiste was an Indian who after a successful season with his traps sold his furs for a thousand dollars. He chartered a special train for Three Rivers and after a spree there, hired a boat at Grand Piles to take him to La Tuque. He may never have heard of his distinguished namesake, but he realized "the voice of him that crieth in the wilderness," for he paid the captain of the boat to blow the whistle opposite every house they passed on the St. Maurice, while he shouted,

"Here comes Jean Baptiste!"

The sight of a great steel trap, prepared for business, gives me a feeling of nausea. For once it happened that when I was hunting, alone in the forest, half a dozen miles from my camp, I stepped on the chain of a big double spring bear trap that chance or design had completely buried in leaves. Had my feet happened to carry me another step, I would not be writing to-day and a human tragedy would have taken the place of one prepared for a bear. Traps set and concealed in that fashion are infernal machines which have cost a number of

lives. It is curious, or providential, that the victims have usually been the men who set the traps. In one case the trapper was caught by both hands in his own trap and perished in unseen agony. I was told of another who was caught by the fingers of one hand and had to cut himself free with his pocketknife. It is an unpleasant subject, yet one may wonder if the trapper, as he hacked away his own quivering flesh and broken bones, thought of his victims, who, not having jackknives, had been compelled to gnaw off their legs.

We are a curious lot of creatures, sensitive only to the suffering that we see. We endow institutions for the care of cats —yet we buy the aigrettes of murdered mother birds and the furs of animals cunningly lured to a horrible death. The lady of high degree may wade out in the mud of the street to stop the beating of a dray-man's horse, even while she is herself clad in the skins of tortured beasts.

Why is it we cannot see these things truly with an unbiased mind, and where the lives of animals are involved, insist that the utmost mercy be shown? Quick death by a bullet seems a sufficiently cruel fate to mete out to any warm-blooded creature without resorting to the barbarous iron trap. The wearing of feathers for mere show is simply unpardonable and should be prohibited by law, as it already is in some States. And the trap should be abolished, too. If every woman could see her furs procured, it soon would be.

JUSTICE TO ALL

The famous engine builder, Corliss, it is said, once stopped work in a great quarry from which stone was being taken for one of his factories. He did this because the quarrymen found a nest of eggs and a mother bird snugly hidden in a niche. "What right have I," said he, "to build up my fortunes upon the ruins of even a bird's home? Wait till the birdies hatch and fly."

HOW TO READ A MAP *

By HOWARD A. GIDDINGS

ABILITY to use a map intelligently is essential to the hunter, camper, cruiser, or traveler. The art of quickly grasping the correct meaning of a map is called "map reading." An astonishingly large number of persons are unable to do this and sometimes get into a great deal of trouble as the result.

A map is a representation on paper, *on a reduced scale*, of the surface of the ground in the region depicted.

In order to comprehend a map one must understand: 1. That each distance on it is a certain fixed part of the corresponding distance on the ground—for example, if two places an inch apart on the map are a mile apart on the ground, then an inch anywhere on the map corresponds to a mile on the ground. 2. That the *directions* of objects from each other on the map correspond to their actual directions from each other on the ground. 3. One must also understand the *relative* height of mountains and hills, the depths of valleys, direction of streams, steepness of slopes, and shapes of features as shown by contour lines and other symbols.

Distance on a map is measured by its "Scale." If the scale is 1/62500, as in the case of the well-known U. S. Geological Survey maps, it means that one inch on the map represents 62,500 inches on the ground, which number is the approximate number of inches in a mile. Therefore, the scale is roughly one inch to a mile. If the scale is 1/40000, the scale is approximately an inch and a half to a mile. By

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laying a rule on the map and ascertaining the number of inches between two points one can calculate from the scale the number of miles between them. As the inch is the common unit of measure in the United States by which the eye is accustomed to judge distances on paper, almost all maps are drawn to a scale representing one, two, three, or more miles to the inch.

To make measurements of distances easier most maps have on them a graphical scale—a line representing a number of miles, and at one end fractions of a mile. In using this, remember to read from o, disregarding the portion of the scale representing the fractional mile.

In order to ascertain directions or courses from a map it is necessary to "orient" it. To do this, spread the map out flat, lay your compass on it, the N-S line of the dial coinciding with a meridian line or the arrow indicating true north, revolve the map until the needle points to the degree of declination of the locality, east or west from north. All lines on the map are now parallel with the lines they represent on the ground. A map may be oriented roughly without a compass as follows: Find on the map the place occupied and also some distant object shown on it, such as a mountain peak. Lay a straw on these points and revolve the map until the straw is sighted on the distant object. All the lines on the map are now parallel with the lines they represent on the ground.

A knowledge of the use of the compass and particularly of its magnetic declination is necessary in using maps. The compass needle does not point to the true north at most places but to the magnetic north. The Zero Curve, an imaginary line at all points upon which the needle points to the true north, crosses the United States in a diagonal line from Mackinac Island, Lake Michigan, to Savannah, Georgia. At all points to the east of the Zero Curve the north end of the needle is attracted and points to the west

of the true north and at all points to the west of the curve the north end of the needle is attracted to the east.

This attraction or variation from true north is extensive and its amount must be known or your map cannot be oriented. This will be understood when I say that in New Brunswick the compass needle points 25° to the west of the true north. In central Michigan the variation is 0, while in the State of Washington it is 25° east.

In the absence of a compass, a watch may be made to serve instead. Hold the watch in front of the body and level in the hand. Revolve it until the *hour* hand points directly under the sun; half way between the hour hand and twelve o'clock will then be due *south.*

To find one's place when unknown on a map, orient the map, select a distant object which is shown on it, lay a ruler or something similar alongside the plotted position of the object, sight the ruler toward the distant object, and draw a line along its edge on the map. Select a second distant object nearly at right angles with the first, sight at it over its plotted position on the map and draw a line as before. The intersection of the lines on the map will show your position.

Elevations on a map are indicated by irregular curved lines called contours. A contour line can be most easily understood if it is regarded as a water line. Suppose the water level of a large lake rises thirty feet. It will overflow surrounding lowland, extend into nearby ravines and gorges and lap the foot of surrounding knolls or hills. Viewed from a balloon, this water line would appear to be very tortuous and irregular, but it would represent *the shape of the ground at that level.* Now suppose the water to rise thirty feet more. The new water line would extend still farther back over the lowland and into the ravines and gorges, but on the steep knolls, when viewed from above, its position would not appear much different.

From this illustration several important points with respect to contours in map-reading become apparent, viz.: 1. All points of a contour have the same elevation above the plane of reference (usually mean sea-level). 2. That where the successive contours are wide apart the slope is gradual, but where they are close together it is steep. 3. Where a ridge juts out, the contours will be convex, whereas in a ravine they will be concave, curving inward toward its head. Contours always head upstream, and thus show at once the direction of the flow of water.

The distance between these imaginary lines or contours is called the *vertical interval.* This is simply the vertical distance between contours, as in the illustration, thirty feet. The horizontal distance between contours is called the *horizontal equivalent.* The vertical interval is usually indicated on maps, and is almost always between ten feet and one hundred feet. Contours usually show here and there, in breaks, their elevation at 500 feet intervals. The height of a given point can be computed by counting the lines.

If the contours show no figures giving the elevations, then the existence of water must be one's guide in distinguishing between watersheds and water-courses. Look to the lie and direction of the streams. Their general trend will indicate the lowest levels. Observe where the contour lines project toward the streams, as this shows the position of watersheds and spurs; where they recede shows the ravines, gorges and valleys.

In computing elevations, *contour intervals* and not contours must be counted. The lowest contour—our original water line in the illustration—must be considered as 0 and not as 1. In addition to contours, certain standard symbols are used to represent features on a map. These symbols are designed to suggest the objects for which they stand. In colored maps, water is always blue and contours are brown or red.

The more common symbols are shown on page 150.

One of the difficulties in making use of maps is that they may not be corrected up to date, and time may be lost in trying to find roads, trails or camps that have ceased to exist, or to locate on the map new features that have been constructed since it was drawn. For this reason always obtain the latest possible map of any region in which you are going.

ANIMAL TRACKS IN THE SNOW

By BARNEY HOSKIN STANDISH

THERE are three classes of people who are especially interested in animal tracks in the snow: country boys who go across lots and through woods to school in Winter, woodsmen in general, whether hunters, trappers, or lovers of nature; and artists who paint winter landscapes and country scenes. The tracks here represented are copied from nature, with the animal in sight, and are nearly as typical of their kind as the tracks of man are of mankind. In each case they represent the animal as if going up the page, and in each group of tracks the upper or head ones are made by the hindfeet (with a possible exception in No. 4). It is with the hindfeet upon the ground in front of the forefeet that the animal makes its spring.

The rabbit sleeps by day in tufts of grasses and brush-piles. At night it comes forth to browse, ornamenting the snow with its almost unchanging groups of footprints. It never walks, but it hops a few inches and jumps several feet. In its jumps, one forefoot is placed directly in front of the other, and the hindfeet are thrown outside and ahead of them. The forefeet come up, one at a time, as the hindfeet go down; and the animal is thus doubled up for the leap. No. 1 represents the tracks. (See page 176.)

The deer is noted for its long leap and the high rate of speed which it is capable of attaining. Unlike the rabbit or the fox, it has hoofs, and a single footprint is not unlike that of the sheep. Its walking-tracks are represented by No. 3. You will observe that they are but slightly spread. No. 2 represents the tracks of its leaps, and of course the forward ones are made by the hindfeet.

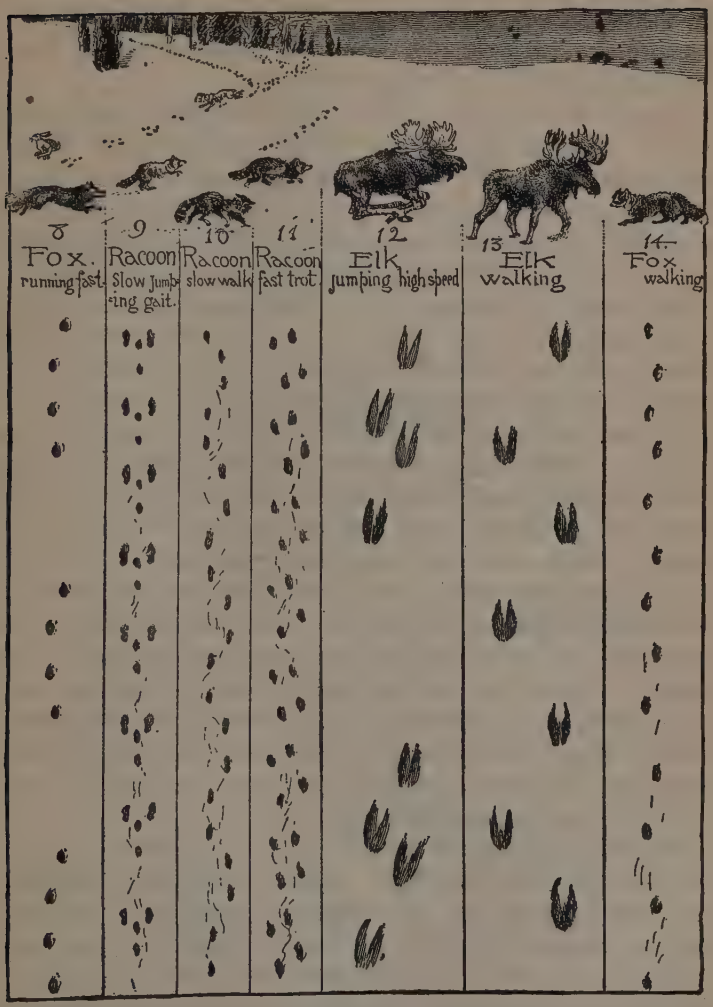
The muskrat is more or less active all Winter, for it stores no food, but obtains it under the ice. This consists of aquatic plants and their roots. On warm days you may find its tracks beside the open streams. It is not a good walker—some woodsmen maintain that it never walks when traveling. The tracks of its short, slow jump are shown by No. 4.

The skunk during the colder part of Winter remains in its den, which is usually a hollow log or an earth burrow. Long before snow disappears, however, you may expect to find its footprints. It sleeps by day and hunts by night. The tracks made when walking are so wide apart that they appear in two rows, as may be seen by looking at No. 5 held level with the eye. This may be because the skunk's legs are short and its body wide. Although this animal has a wabbling canter, it is slow on foot, and seldom attempts to run when in danger. It has a surer means of self-defense. No. 4 shows the tracks of the short, awkward leap.

The mink makes its nest in the banks of streams, in hollow logs, and among rocks. Its feet are partly webbed, and it is an excellent swimmer, capable of catching fish. This animal seems, however, incapable of walking, and when on land or ice proceeds by a series of jumps, often so long that you would say it was fleeing from danger. For each jump it leaves but two tracks. This, no doubt, is the result of raising its forefeet, one at a time, and sliding its hindfeet under them, as the leap is finished. No. 6 represents the tracks that it leaves in the snow. The weasel and ermine make similar tracks.

Squirrels during the coldest weather of Winter sleep in their

nests in hollow trees, and also in those made of leaves in tree-tops. But on warm, sunshiny days they come forth. Therefore it cannot be truly said that they are hibernating animals.



Their forelegs are short compared with their hind ones, and the feet on these legs have but four toes, while their hind ones have five. As they pass from tree to tree in the snow they

leave their four-cornered groups of tracks; and you may notice that the five-toed feet make the front tracks. They are larger and wider apart than those of the forefeet.

The fox is noted for its long leaps and great speed, being able to overtake and devour rabbits, and to escape danger itself when pursued. When walking it puts one foot nearly ahead of another, thus leaving what approaches a single line of tracks. These tracks much resemble those of the domestic cat, and many a hunter has followed the latter, thinking himself in pursuit of Reynard. No. 14 represents the tracks made in walking, and No. 8 those in running. Of course, in the latter figure the forward or upper tracks are made by the hind feet, for it is from these feet he is able to spring so far.

The raccoon's favorite home is a hollow tree near a stream or body of water. This animal hibernates in Winter, but long before the snow is off it is dotted and figured by its feet. Its tracks are along the river and in the gorge by the brook, where it goes to hunt for clams, snails, and water-beetles. In fact, it is hungry enough now to eat a dead fish or the bits of the partridge that the owl has left. Its hind feet are shaped much like the feet of a child, but they have long toes. The tracks of these long, wide-spreading toes will not be likely to be distinct in the snow, but in the mud they show plainly. It is not a fast runner, and its lope is somewhat logy. No. 9 represents the footprints of its leap at a low rate of speed; No. 10, a slow hunting-walk; and No. 11, a trot.

The elk, though much smaller and slimmer than a domestic cow, has feet much like hers. Indeed, they are so large that its walking-tracks (No. 13) might be mistaken for those of the tame animal. The elk, however, is capable of long leaps. I have known one to clear twelve feet when hard pressed. No. 12 are typical tracks, but the elk is more apt than the deer to vary from the type. When jumping a stream or object that requires unusual effort, the elk places its feet as the rabbit does (see No. 1).

THE WEATHER

There is a rainbow in the sky,
Upon the arch where tempests trod;
God wrote it ere the world was dry—
It is the autograph of God.

HOW TO FORETELL THE WEATHER

By A. B. BEARD

IF you are an outdoor boy and have lived for a time in the open, or if you intend to be an outdoor boy and to live for a time in the open, you will know how very useful weather wisdom can be to you; you will understand how much your pleasure and comfort in camp and on the trail, sailing or motoring, depend upon the weather and in knowing what kind of weather you may expect to-day, to-night, or to-morrow.

Each of the various seasons of the year has its own peculiar weather, generally speaking; but every season also gives us many surprises, and the unexpected often happens. All weather signs will fail at times, but that is no token that the signs are wrong, it is simply that something has happened to prevent them coming true. For instance: rain is caused when, in some part of the country, the air is hot and full of moisture and changes occur that chill it below its dew-point; but there are a number of things which may happen to prevent the chill reaching the hot air, and then the expected rain does not arrive. So, you see, no one can at all times prophesy with absolute certainty what face the fickle weather will decide to show to-morrow; but if you keep your "weather-eye" open to the changes about you, you may be fairly sure of what is coming.

Fair Weather

If you want fine weather, look for fine-weather signs. Here are some of the most reliable, for they are based upon scientific facts:

When the sun sets in a sea of glory, that is, when the sunset sky is red, you may expect clear weather on the following day.

At night, when the moon is clear and shows clean edges, with no halo or ring of mist surrounding it, there is little danger of rain.

When the wind blows steadily from the west, the weather will continue fair; it very rarely rains in our eastern States with the wind in the west.

Watch the smoke from a chimney or from your camp-fire—it is a good barometer. If the smoke rises high, it means clear weather. The smoke will also show you from which direction the wind is blowing; so will a flag on an upright flagstaff.

A gray early morning, not a heavy, cloudy one, promises a fair day. This is well put in an old rhyme which I advise you to commit to memory if you do not already know it, for it gives the weather significance of both sunrise and sunset:

> Evening red and morning gray
> Sends the traveler on his way.
> Evening gray and morning red
> Brings down rain upon his head.

A heavy dew at night is seldom followed by rain the next day. Think of it this way and you will remember: wet feet, dry head.

If there are no clouds at the western horizon, you need not worry about others. The *cirrocumulus* clouds are fair-weather clouds. The broken cumulus clouds are signals of unstable atmospheric conditions.

Animals are said often to show by their actions what the weather will be, and there is reason in this. Some of them certainly have a knowledge of coming storms. We are told that spiders are especially sensitive to weather changes, and, when they make new webs, the weather will be fair; if they continue spinning during a shower, it will soon clear off.

Rain

Don't start on an excursion if the sky is red at sunrise, for in Summer you may expect several hard, tempestuous showers; in Winter there will very likely be steady, hard rain with wind. The old rhymester knew this when he wrote:

> A red morn, that ever betokened
> Wreck to the seaman, tempest to the field,
> Sorrow to the shepherd, woe to the birds,
> Gusts and foul flaws to herdmen and to herds.

There will be rain when the sun sets behind a cloud and when it rises in one. When the western sky at the horizon is a sullen gray at sunset, or is banked with dark clouds, that also means rain.

Although clouds may not threaten, look for rain when the wind blows from the east. A northeast wind usually brings a cold, steady rain which lasts several days.

If there is a ring around the moon, do not count on continued fair weather; unless some new conditions arise, there will be hard rain within a day or two.

When the blue sky begins to veil itself in a light gray mist, you may know that rain is forming overhead and will soon come down.

When the leaves of the white poplar show their silver lining, look out for rain. In the Catskill Mountains, last Summer, this sign never failed us. Always, just before a rainstorm, a group of these trees, stirred by the east wind, turned their leaves in masses and seemed to become veritable trees of silver.

When the camp-fire smoke hangs low, or is driven to the ground by the wind, you may expect unpleasant weather.

A brilliant atmosphere, so clear that it seems to bring distant mountain-peaks and far-away objects quite near, betokens coming wet weather. The saying is: The farther the sight, the nearer the rain. Dazzling white clouds on an intensely blue sky often go with this clear atmosphere, and the

beautiful day that seems so perfect is called by some people a weather-breeder.

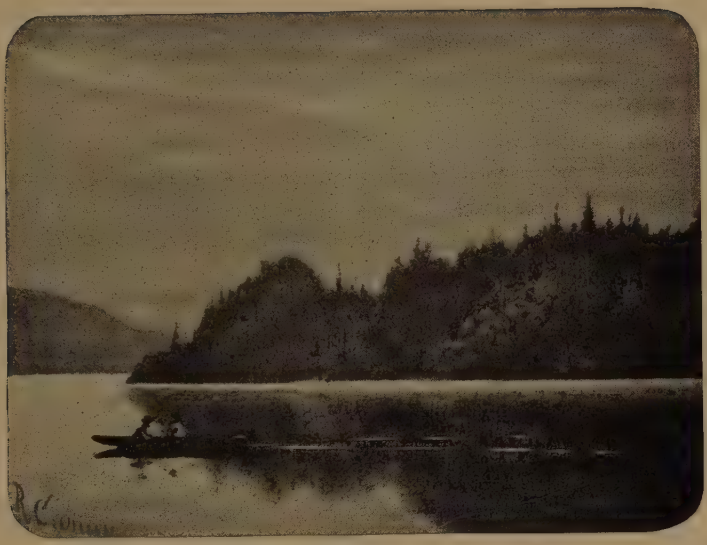
As a child, I learned to distrust a too fair opening of the day, because I found that strong sunlight and a deep blue sky before seven o'clock in the morning usually brought clouds in their wake, and often, by ten o'clock, it would be raining and my outdoor Saturday spoiled. I notice that the sign still holds good, though my observations now are not confined to Saturdays.

Sometimes on a deep blue sky, among floating clouds of white, you may discover a small spot of dark gray, a very small spot it may be; but keep your eye on that insignificant-looking little cloud—it usually means mischief. On the water it is often the herald of a sudden squall or of bad weather of some kind; on land it may mean a gusty shower if nothing worse. If it is going to be ugly, this little dark cloud will grow larger and larger until it swallows up the white clouds, spreads out over the sky, or is followed by other dark clouds—and the storm is upon you. It is best to take to shelter when you see the dark cloud growing, for such storms come up very quickly.

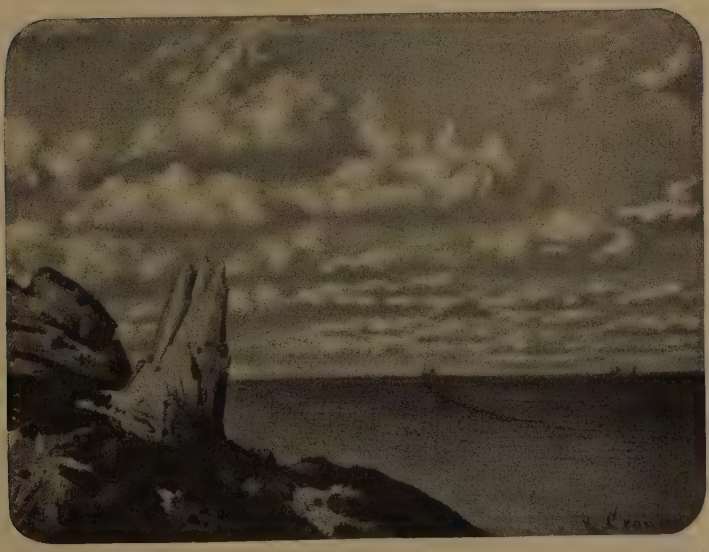
An evenly gray sky does not necessarily mean rain. We have many gray days when no rain falls, though sometimes the gray sky sends down sprinkling showers. A rain-cloud is called a *nimbus cloud*. The drifting, white clouds that cling to and tear themselves on the sides of the mountains are composed of heavy mist, which will generally be condensed into rain before the day is over.

Mackerel scales and mare's tails
Make lofty ships to carry low sails

seems to imply wind as well as rain, but as "mare's tails," or *cirrus clouds*, are usually composed of ice crystals, like the ring around the moon, we may be pretty sure of the rain. "Mackerel scales," which *are cirro-stratus clouds*, also indicate rain. These signs often give notice of weather some days



STRATUS CLOUDS



CUMULUS CLOUDS

NIMBUS CLOUDS

CIRRUS CLOUDS

ahead. Two days ago I noticed that the sky was streaked with mare's tails, and to-day there is a steady downpour of rain, though but little wind.

Flies are most troublesome just before a rain, crawling and clinging in an exasperating fashion, and collecting on the outside of window-panes and wire screens. In Summer, gnats, black flies, and other small insects are most annoying before rain.

Thunderstorms

You may always expect thunderstorms in July and August. They usually come up in the afternoon, and before they break the air becomes hot and sultry. You can generally tell by the clouds when the approaching storm will be a thunderstorm. Often, on a fair day, bulbous-looking clouds will appear in the west and show white against the blue sky. They are pretty clouds and look harmless enough at first, but they are *thunder-heads*, and later you will see them slowly climbing up and growing darker. Other dark clouds arise and move toward the east, the sun is hidden, and the sky grows still darker. Then the rumbling of distant thunder is heard, lightning plays among the clouds, rain begins to patter in large drops, and the storm has arrived. It may be several hours after the *thunder-heads* appear before the storm reaches you, but don't count on that much time.

Sometimes the storm comes up in a densely black cloud, like a solid wall that rises until the sky is darkened as at night. Gusts of wind usually act as an advance-guard, blowing the dust of street or road in clouds, and sending papers and dry leaves flying. One is often surprised to see that this wind starts in the west, but, unless the clouds blow over you, you will find that the wind will suddenly change.

The safest place to be during a thunderstorm is in the house; barns are not safe; the most dangerous place is under a tree, especially an oak tree, and it is well to keep away from running

water. Do not stand at an *open* window or open door, and avoid an open fireplace; in other words it is not wise to stand in a draught. A tall flagpole will attract lightning, and the interior of the woods is safer than the outskirts.

It is not so much the lightning as the thunder that frightens people, yet thunder hurts no one. When some time elapses between a flash of lightning and the following clap of thunder, the lightning is a good way off; when they come close together, it is near. If you are nervous or afraid during a thunderstorm, try to overcome the feeling. You can, you know. The danger is comparatively slight, and there is not the least use in being afraid. You can do nothing but avoid the most exposed places, and may as well enjoy the magnificence of the storm. When you can watch a mighty storm without fear, you will have interesting experiences, you will catch a glimpse of the workings of some of the tremendous forces of nature in their most spectacular form.

It is said that when sea-gulls fly landward, and are seen in large numbers on and near the shore, a storm is brewing at sea. Land-birds become uneasy and seem greatly excited before the coming of a severe storm.

When the wind is in the east,
'Tis good for neither man nor beast.
When the wind is in the south,
It blows the bait in the fish's mouth.
When the wind is in the north,
Prudent mortals go not forth.
When the wind is in the west,
All things then are at their best.

The east wind, which brings rain in Summer, brings snow and sleet in Winter. The south wind brings a winter thaw, a spring freshet, and a hot spell in Summer. It may also bring rain at any season. The north wind, bitterly cold in Winter, freezing rivers and ponds and providing good skating, is refreshingly cool in Summer. The west wind—how very

important the west is—brings clear, bracing weather. One is in good spirits when the wind is in the west.

Often the dark clouds, which you think are rain-clouds, carry wind, not rain. The boisterous northwest wind frequently comes in on a drifting, light-colored or white cloud with dark edges.

When the sky becomes ominously dark and turns a grisly yellow and green in the west, prepare for a violent windstorm.

Clearing Weather

The direction of the wind must change for the weather to clear after a storm. Though the rain may stop and the sun burst forth, it will not remain clear unless the wind changes. Noon is the time to look for clearing weather, though some storms pass off at sunset.

When the clouds break away on the western horizon and the sky in the west begins to brighten between the hours of twelve and one, you may safely expect a clear afternoon. Blue sky in other directions than the west cannot be counted on as a reliable sign of clearing weather. If the weather clears during the night, it will not stay clear. When the mist clinging to the mountain-side rises in long streamers like smoke from signal-fires, the day will probably clear.

Rainbows often herald clearing weather, but not always. The following old rhyme shows that it makes considerable difference what time of day the rainbow appears:

> Rainbow in the morning,—sailor's warning.
> Rainbow at noon,—rain will stop soon.
> Rainbow at night,—sailor's delight.

Another version of the same rhyme is:

> Rainbow at night
> Is the sailor's delight;
> Rainbow at morning,
> Sailors take warning.

CELEBRATING GROUND-HOG DAY *

By ENOS A. MILLS

A BEAR'S TRACK in the first autumn snow! This was a sure sign, Old Jim said, of a mild Winter. Yet Old Jim had just been telling me that all the signs said the coming Winter was to be a cold, snowy one; the geese had raced south early; squirrels had been gathering cones late into the night; beaver fur was the heaviest ever seen; several kinds of birds would soon be wearing feathers enough for a pillow—all these were preparations for a long and cold Winter. On February second the ground-hog was sure to look forth on snowy distances, to see his shadow, and then retreat to the bottom of his den, for Winter was scheduled to last still six weeks longer. Off I went to try to discover if other bears were making the mistake of contradicting famous weather signs. Either this bear did not know what he was about or else the hard winter signs were not correct.

Bears hibernate every Winter. But if they are still about and making tracks in the first snow, this is a certain sign that Winter will be slow in arriving and that, of course, they will be in no hurry about turning in. For two days I searched the mountains for bear tracks. The snow was dotted and splashed with tracks—deer, sheep, mice, and birds. A snowshoe rabbit made a track large enough for a lion; while a cottontail and a magpie left record of their misfortune, each had lost a foot. Late afternoon of the second day I found a fresh bear track and on the way home another—the track of a grizzly. Now, a grizzly is one of the wisest fellows in the woods and

* From "*Waiting in the Wilderness*," by Enos A. Mills; © by Doubleday, Page & Company; used by special arrangement with author and publisher.

the fact that he had not heard that there was to be a long, cold Winter, was almost enough to cause me to doubt the signs said to have been made by many other wild people.

Old Jim had complete confidence in the weather wisdom of the ground hog, as did everyone else whom I had ever heard mention him, so I quietly resolved to keep track of his doings and to pick up ground-hog information, even though I neglected a number of good books. The ground-hog weather lore says that on February second this animal wakes from his hibernating sleep and comes out of the den. If he sees his shadow on the snow, there will be six weeks more of Winter; if he does not see his shadow, Winter is practically over.

Every near-by ground-hog den was located. Only one track was found. Ground hogs commonly are hog fat by late August and den up by mid-September. With the first colored leaf that Autumn flutters they make haste to dig a new, clean den in which to sleep until the first flower of Spring.

In looking up ground-hog day I learned that it was also Candlemas Day and read,

> "Observe which way the hedgehog builds her nest,
> If by some secret art the hedgehog knows,
> So long before, the way in which the winds will blow,
> She has an art which many a person lacks
> That thinks himself fit to make our almanacks."

I Watch for the Shadows

I thought that ground-hog day would never come. Winter, as Old Jim had said it would be, had been cold and snowy. If the ground hog saw his shadow February second, he would return for a sleep while Winter lasted six weeks longer. But if it was a cloudy day, Spring must be near; in a day or two the ground hog would be hunting for the sunny side of a cliff to find the first green salad on which to break his long fast.

February second I was out before daylight. But the morning was cloudy and unless there was a clearing the ground

hog could not see his shadow. The predictions for six weeks more of Winter might be overthrown, that is, they might be if the ground-hog sign was correct—and everybody had said it was. I started off as soon as I could see. There were fourteen ground-hog dens to be visited. I wanted to know if ground hogs came out on this day and if they did, I wanted to see at least one.

The first animal I saw was a rabbit. He sat up straight, in fact he almost stood up. When rabbits sit up straight it is a sure sign, so I had heard, of cold weather. Surely the sky would clear so that the ground hogs could see their shadows!

I nearly wore out a pair of boots rushing from ground-hog den to den. Dark, low-drifting clouds filled all the mountain valley. It did not look hopeful for sunshine and ground-hog shadows. But shadow or no shadow I wanted to see a ground hog show his head from the entrance to his den. The highest den visited was one far up the mountain-side which I hoped might be above the clouds and in the sunshine. Its snow-filled entrance holes showed that the weather-maker had not even looked out. February second had been cloudy from morning to night. I had not seen a ground hog. What would the remainder of the Winter be? That night I went to sleep while repeating:

> "If Candlemas be bright and clear,
> We'll have two Winters in the year."

Winter ended early, it was not a long or a severe Winter after all. The bear was correct, and so, too, was the ground hog; that is, if they had anything to do with weather predicting and arranging. But the birds, squirrels, and beavers who had made much extensive winter preparation had made a mistake. But did human weather prophets understand the plans and preparations of any of these interesting wild people?

Down the mountains I walked fifteen miles for a visit with another boy. We talked over weather signs, planned to meet

next ground-hog day, and above all to keep quiet and learn all we could about the ground hog and other animal ways.

Signs of Winter Weather

Squirrels commenced gathering pine cones for Winter as early as the cones were ready—the last week in July. These cones were placed by stumps, logs, and in hollow logs and roots in small piles or nests. These nests were little holes about the size of a robin's nest dug into the leaf and trash coverings of the forest floor. Each nest had from five to ten or sometimes twenty cones, and these cones were never more than two deep. All the cone piles of each squirrel were within a space ten feet square and within thirty feet of the tree in which the squirrel had his winter home.

One squirrel had one hundred and fifty-four lodgepole pine cones, another one hundred and thirteen yellow pine cones, a third two hundred and fifty-seven spruce cones, and still another more than four hundred assorted pine and spruce cones. Each had gathered the cones that were closest to his home. During the preceding Autumn these same squirrels had gathered nearly the same number of cones, had stored them in the same spaces as this year, and had arranged them in almost the same manner. As more cones were gathered each year than were used, I saw no way to safely predict the weather from information which squirrel harvests furnished.

One afternoon George came riding up on horseback. He left his pony standing and hurried over to meet me faster than I was rushing to him. He had the startling news that a big ground hog had just made a den by one corner of their garden. His grandmother was certain that this was a sign for a cold Winter. Whenever animals and birds come to live close to your house, a cold Winter is not far off. This was something new in ground-hog lore and I heard it with startled interest.

I could not just make out if there might be some other

reason for the ground hog's den at that place. I figured that this must be a wise ground-hog. And he was. Before the Summer was half over he was the fattest ground hog in the region. He had eaten everything in that corner of the garden closest to him.

During the Summer I dug into a number of ground-hog dens. All but one were more than four feet beneath the surface. Each den was about two feet across and more than a foot high. The den was reached by one or more tunnels from the surface. Two of these dens reminded me of a big four-legged spider; the den was the body and each leg was a tunnel to a different place in the surface. In digging into these dens I must have moved tons of earth and rocks.

One day a prospector asked me if I was after gold. After he had looked at a number of mineralized pieces of quartz which I had dug out, he told me of experiences with ground hogs. He had found one mine by following up a piece of gold quartz which a ground hog dug out. When I asked him about ground-hog day he laughed and said that it was a superstition based on the assumption that the ground hog does come out of his den February second. "But," he said, "there is not a record that anyone has ever seen them, and I have not been able to find anyone who has seen them out on this particular day. I have repeatedly watched for their coming out but without seeing them or finding any record of this in snow-filled entrance holes to their dens. A ground hog, a bear, or any hibernating animal may come out on this day or any day, but his coming out has not the slightest influence on the weather." Before going on with his pack burro, the prospector took a piece of charcoal and on the white bark of an aspen showed me how to make drawings of the dens which I dug into.

The Ground Hog's Den

When there is opportunity, ofttimes there are numbers of dens in a comparatively small area. Conditions must be

favorable for the making of a den. Often the den is by an outcropping rock ledge, preferably in gravelly soil. Sometimes along the side of a rock and in fractures of it there is opportunity to dig down. Other dens are by and beneath bowlder piles or beneath the roots of big trees. In any case, the ground hog desires a background—some place where he can lie in the sun and feel secure.

Ground hogs become so hog fat that they make a comical show with tail flopping as they make hasty short gallops for the den. I tried to weigh a big hog near my cabin. While he was out I plugged entrance holes, then got him in a sack. He was a fat pig and weighed I know not how much more than the twenty-four pound limit of the scales.

He was yellow-brown over back and sides with an orange colored belly, cheeks nearly white, paws black, and forehead nearly black. His ten-inch tail, covered with hair from four to six inches long, was like a big dust brush. This fellow and numbers of others became half tame and would come close for turnips and other things which I carried to them.

A ground hog has a heavy body and short legs and at best is a low-geared animal. Having enemies, he generally keeps close to the den. There are exceptional cases where old ground hogs do wander far away. Two Summers while I was guiding on Long's Peak, a ground hog summered on the summit. A few minutes after I arrived on top with a party of climbers he showed himself and waited for lunch scraps. After he was better acquainted he did not wait but expected to have helpings from the first table. His winter den was two thousand feet below the top. Ground hogs, especially in Spring, wander in search of the first green plants; usually, from their tracks, they know just where these are most likely to be found.

Many times I have seen four little ones around a den. Often they were asleep in the sun, and other times chasing one another around a stump or having a game of tag over the rocks. Several times in August I found young hogs alone,

each digging a den for himself. I do not know if they left home or mother sent them.

The ground hog hibernates, but the prairie dog, to whom he is closely related, does not hibernate. In watching the ground hog I noticed that two kinds of chipmunks hibernated, and one day I learned that bumblebees were also hibernaters. It was fun to examine a nest in which the bees were having a peace sleep with stings not working and no need of a fellow running and striking after making a friendly call, which bees so often pretend to understand is not friendly.

Ground hogs are found in a majority of States in the Union. They are also called woodchuck, rockchuck, chucker, and marmot. If their home is close to a garden or a grain field, they are likely to be unpopular with the owner, because of too many raids on those things which the owner wants for himself. They are sometimes dug out by wolves, foxes, and even by bears. I often wondered how all this weather lore was given to the ground hog.

The Beaver's Winter Plans

The second Autumn I still half believed in signs and wandered about, looking for bear tracks and everything that was supposed to reveal advance weather secrets. A number of hunters and trappers and also other people were asked how to tell for certain that birds and beavers were wearing thicker or thinner coats than usual; but no one appeared to know any certain way.

I dropped these signs and investigated beaver colonies. One beaver colony began work extra early, but as this colony was building a new house it naturally began work earlier than other colonies. One colony cut and piled in the pond two hundred and ninety-three aspens for winter food; another colony just one minute's walk up-stream harvested only sixty-eight. The dams that were repaired appeared to need repairs; while those that were not touched did not need attention. In

trying to see how to predict weather from beaver work I got a headache. Each beaver colony appeared to have its own way of doing things, or else each was doing what it needed to do. The big harvest may have been for a colony with many beavers and the small harvest for a few beavers. I do not believe the beavers did any guessing about the Winter. They were prepared for any weather. The beaver is an animal with unusually interesting ways. Many of his customs are not well known. It is said that if he lays up more supplies than usual, or grows thicker fur than usual, that the Winter will be colder than usual. But any boy who has had the fun of watching a beaver colony in Autumn will realize that the beaver prepared for a real Winter every year at the beginning of Autumn.

Most ground hogs were not seen after early September. Many of those around me dug new dens. A number who had summer dens out in the meadows by rock piles moved back into the woods. The entrance ways to dens in which hogs were hibernating appeared to be partly plugged a foot or two beneath the surface. There was no plan that I could see for coming out on ground-hog day. Each winter den examined had a short tunnel which led off into the gravel, and in the end of this tunnel there was buried excrement. Evidently when a woodchuck enters his den for the Winter he plans to stay inside until Spring.

Two nights in advance of ground-hog day I arrived down the mountain at the home of my friend George. I wanted to be on time. George was still strong for signs and all this mysterious weather lore. After I had related a number of my experiences and observations and facts I had read or heard, he continued to believe, but he wanted to see what might be discovered.

George and I Go Exploring

Ground-hog morning was absolutely clear. There were five inches of snow; we wanted snow because there was a

dispute among the prophets as to whether the shadow of the ground hog would count if not seen on the snow. We were two miles from the house when the sun came up. We wondered if ground hogs were early risers, as we shivered nearly frozen in a place where we were close to three dens. Nothing showed up, so we moved on. These entrance ways to the dens were partly full of untracked snow. We planned to return later in the day and see if anything made a footprint in the snow.

Hours were spent crawling and looking. Not a ground hog or even little pig children were seen. In going across an opening we saw a line of tracks reaching from a den into the woods. While I was looking into the woods George grabbed my arm all excitement and pointed at a brown head poked forth from the hole and making a shadow on the snow.

Then this shadow-maker climbed out and hurried off in a crippling gallop. It was a three-legged coyote. When one goes out looking for something, he is certain to see something of interest, even though this is not a ground-hog shadow on the snow. That animals are crippled and that they so often play, are two of the surprises I had in wandering the wilds hunting with a kodak.

Later afternoon we returned to the first dens watched in the morning. The snow in the entrance ways was still untracked. Our shadows showed upon the snow—where the ground hog had not shadowed. But the shadow of a big peak to the west would soon slip across the den and it would then be too late this year for a ground-hog shadow to produce six weeks of snow and cold.

It was near sundown and we had almost lost faith in all forecasting weather signs. What was the use bothering about signs that at best did not agree? We could not change the oncoming weather and we could have fun outdoors in all kinds of weather.

We started for the house and on the way we talked about

a number of catchy but unreliable weather signs—signs that we knew had not made good in the mountains.

"If March comes in like a lion, it will go out like a lamb. If it comes in like a lamb, it will go out like a lion."

"Cold weather comes quickly, and warm weather comes slowly."

George said that he remembered one time when a hot day had come quickly in Winter. One cold morning he went out for a look at the thermometer before breakfast. It was twelve below zero. But he could hear a windstorm coming out of the west. It was the Chinook wind, a warm, dry wind which melts snow quickly and carries the moisture off on the wind without ever wetting the earth. The Indians call it the "snow eater." George had breakfast and did a few chores, then had another look at the thermometer. It was up to forty-one and the snow was rapidly melting.

I then told him of a night while out camping in an old cabin. I was cold in my sleeping bag in the early evening. But during the night I had gotten so warm that I thought the cabin on fire. It was just a Chinook. During the night there was a change. At five o'clock in the evening there was seven inches of snow over the earth. At six the following morning it was gone, and the ground was bare and dry.

Out o' Luck

As George and I neared the house, we were overtaken by a man on horseback. During the day's ride he had seen coyotes, prairie dogs, deer, and mountain sheep; but not a ground hog. He had ridden up from the plains where it had been snowing all day. This meant that several miles away the ground hogs could not see their shadow, and that those up here could have seen theirs if they had cared to look.

What kind of weather would we have during the next six weeks? Would it be determined by the ground hogs of the plains or by those in the mountains? What kind of weather

would result if there was sunshine in New York and cloudy weather in Pennsylvania on the same ground-hog day? If—. We gave it up in despair.

The ground hog, in common with other animals, has lived upon the earth for countless ages, perhaps about three million years, so geologists say. Long before he had been heard of, there was both weather and climate over this good old world of ours. There had been Ice Ages and world-wide climate so balmy that palm trees had grown in the Far North—not far from the pole.

Reliable Weather Signs

But there are a few weather signs, more correctly indications, that are closely allied to woodcraft. Through them one can usually tell in advance that something is going to happen—that there is to be a change in the weather.

Among these changes are classed unusual gatherings of birds, listlessness of animals, smoke drifting down and around as though lost, and animals showing interest in a particular direction or collecting at a sheltered place. Often animals realize hours in advance that there is to be a change in the weather. Each human and animal is a delicate barometer which responds to air changes. Animals appear particularly sensitive and responsive to these changes.

The actions of mountain sheep have several times suggested to me that wind or snowstorm was coming. One cold morning I was crossing the Continental Divide. On the sky line I saw a number of sheep pointing their noses into the west. Closer to me another flock walked directly to the plateau rim and pointed their noses into the west. There I left them standing. Early the following morning a Chinook came roaring out of the west. Another day three separate flocks were watching the northeast sky. Twenty-four hours later a blizzard arrived from the northeast. But there probably isn't anything in the make-up of animals that will give long range

weather information. These sheep simply had delicate advance wireless messages of what already was coming.

Our Great Discovery

Just before George and I reached the house something stuck its brown head out of a hole. Bushes prevented our having a good look at it. The thing ducked back while we were crawling around for a better viewpoint. Both thought it was a rabbit but it might be a ground hog. We had lost faith in the weather business of ground hogs, but if one was loose on ground-hog day we wanted to be sure and to have a look at him.

We made haste to try to rout the fellow out. George was poling away at a lively rate in one entrance hole with a long, slender pole, while I was watching the other entrance and trimming another pole with which to explore in case George failed to start anything.

"I'm prodding something," called George. "It feels like a fat pig," he called out. Then he pulled out the pole and looked at the end to see what kind of hair might be sticking to the top of it. Then he went to poling again. I lay down with my ear close to my entrance hole so as to hear any movement inside. There was a clawing inside and in my excitement I called, "He's coming out."

George came on the jump, pole in hand, to see what HE was. Out rushed a badly frightened rabbit. I was so excited that it never occurred to me that there might be something behind this rabbit to give him such a fright. Then out came a skunk. He was not at all frightened; but we were. Both dropped our poles as we jumped back. These fell on or by the skunk. This was too much. We had heard that a "polecat" should never be hit with a pole. We had pole-prodded this fellow. Completely routed, we moved quickly, but the skunk went into action so speedily that we were shelled with skunk gas.

WEATHER WISDOM

When the dew is on the grass,
Rain will never come to pass.

When the grass is dry at night,
Look for rain before the light.

When grass is dry at morning light,
Look for rain before the night.

Three day's rain will empty any sky.

A deep, clear sky of fleckless blue
Breeds storms within a day or two.

When the wind is in the east,
It's good for neither man nor beast.
When the wind is in the north,
The old folk should not venture forth.
When the wind is in the south,
It blows the bait in the fishes' mouth.
When the wind is in the west,
It is of all the winds the best.

Evening red and morning gray
Sends the traveler on his way.
Evening gray and morning red
Sends the traveler home to bed.

If the sun goes down cloudy Friday, sure of a clear Sunday.
If a rooster crows standing on a fence or high place, it will clear. If on the ground, it doesn't count.
Fog in the morning, bright sunny day.
If it clears off during the night, it will rain again shortly.
Sun drawing water, sure sign of rain.

KNOTS AND KNOT TYING

DO IT WITH ALL THY MIGHT

There can be no greater blessing for a man than to have acquired that healthy and happy instinct which leads him to take delight in his work for work's sake; not slurring it over, not thinking how soon it will be done and got rid of, not troubling himself greatly about what men say of it when it is done, but putting his whole heart and mind into it, feeling that the thing he has turned out, be it work of the mind or work of the body, is conscientiously and honestly perfect to the best of his power.—INLAND PRINTER.

ROPE AND ITS USES *

By A. A. BURGER †

SINCE time immemorial, a piece of good rope has always held an attraction for wide-awake boys, probably because of the long chain of associations that are connected with it. What boys' story worth the reading but that has as one of its main characters a piece of rope? It may be a rope ladder. It may be a cable into a marvelously rich and newly discovered gold mine. It may be a lariat that ropes wild steers or even buffalo, or again it may be a boat's painter, or portion of a ship's rigging, or the guy to an eager-to-be-off balloon, or what not, but in any event there is always a rope to tie or untie, and the success of the whole enterprise often depends on "our hero's" knowledge of how best to handle that particular rope. Yes, every boy should understand rope and its uses. There is scarcely a more engrossing pastime than learning how to quickly and efficiently tie the innumerable variety of knots and hitches, to say nothing of splice and the rest. With that thought in mind, the following article with its many careful diagrams has been prepared. Master it, and you will have mastered the art of using rope under any and all circumstances.

General Information

Kinds of Rope.—At the present time rope is made chiefly from sisal or manila hemp. The former, which is the whiter

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† Formerly of the Agricultural Extension Department, Iowa State College, now County Agriculturist, Blackhawk County, Iowa, co-operating with the U. S. Dept. of Agriculture, and the Iowa State College.

and cheaper fiber, comes from Yucatan; the latter from the Philippine Islands, and receives its name from the chief port of shipment.

A rope is composed of a certain number of "strands," the strand itself being made up of a number of single threads or yarns. Three strands, laid or twisted together, form a "hawserlaid" rope, and three such hawsers similarly laid make a "cable-laid" rope or a "cable." A "shroud-laid" rope usually consists of four strands laid around a central strand or core. The prepared fiber is twisted or spun to the right hand to form a yarn; the required number of yarns receive a left hand twist to make a strand; three strands twisted to the right make a hawser; and three hawsers twisted to the left form a cable. Thus, the twist in each operation is in a different direction from that of the preceding one and this alteration of direction serves, to some extent, to keep the rope in its proper form.

Why Rope is Twisted.—The primary object of twisting fibers together into a rope is to hold together the strands when a strain is applied. Twisting also compacts the fibers and prevents, to some extent, the penetration of moisture. The proper degree of twist in ropes is generally such that the rope is from three-fourths to two-thirds the length of yarn composing it. Hence, when a weight is hung on the end of a rope there is a tendency for it to untwist and become longer. In thus untwisting, the strands will loosen, the weight will revolve, and the yarns in the strands will tighten until the strain upon them equals the strain upon the strands. In making rope, the aim is to make the tension on the strands and on the yarns composing the strands equal. But since this is impossible, it is always necessary to take out the "turns" in a new rope for the first two or three days that it is used. In case a new rope is inclined to be so "kinky" that it cannot be used, the twist may be removed by tying it to a wagon and dragging it about on the ground.

Weakening Effect of Knots.—Knots, hitches, and turns weaken the tensile strength of any kind of rope. When a load is applied to a straight rope the strain is evenly distributed on all the fibers, but in the case of a knot or hitch the greatest strain occurs on the fibers on the outside of the bend, with the result that they are overloaded and break. The strain is then thrown on the inside fibers, with the result that the center rope soon gives way. The strength of rope decreases as the abruptness of the bend increases. It will be seen in the following table that when the strength of a straight rope is represented by 100 the same rope with a simple overhand knot has a strength of but forty-five. In the case of the timber hitch where the bend is less abrupt the relative strength is sixty-five and in the eye-splice where the bend is still less abrupt, ninety.

APPROXIMATE EFFICIENCY OF KNOTS, HITCHES, AND SPLICES

	Straight rope	Eye-splice over an iron eye	Short splice	Timber hitch anchor band	Clove hitch, running bowline	Square knot, weaver's knot	Overhand knot
Efficiency of the knot.....	100	90	80	65	60	50	45

Care of Rope.—The life of ordinary rope is materially increased when it can be kept in the dry. Ropes which have become wet should always be thoroughly dried out in the sun before they are coiled up, and hay ropes which are used inside of barns where they may absorb moisture from the drying hay should be removed when not in use. The alternate drying and wetting is very detrimental to the rope fiber.

Ropes are made with the twist of the strands to the right and hence, when coiled into rolls, should always be coiled in the same direction or "with the sun." When the rope is uncoiled, the end first laid down should be drawn up through the center.

Whenever the rope is unwound from the end last laid down, there is always a tendency for it to twist. The same is true of binder twine and for this reason if it is unwrapped from the outside it will twist and snarl.

Explanations of Terms Relating to Cordage

Yarn—Fibers twisted together.
Thread—Two or more small yarns twisted together.
String—The same as thread but a little larger yarns.
Strand—Two or more large yarns twisted together.
Cord—Several threads twisted together.
Rope—Several strands twisted together.
Hawser—A rope of three strands.
Shroud-Laid—A rope of four strands.
Cable—Three hawsers twisted together.
Yarns are laid up left-handed into strands.
Strands are laid up right-handed into rope.
Hawsers are laid up left-handed into a cable.

A rope is:

Laid —By twisting strands together.
Spliced—By joining to another rope by interweaving the strands.
Whipped—By winding a string around the end to prevent untwisting.
Served—When covered by winding a yarn continuously and tightly around it.
Parceled—By wrapping with canvas.
Seized—When two parts are bound together by a yarn, thread, or string.
Paid—When painted, tarred, or greased to resist wet.
Haul—To pull on a rope.
Taut—Drawn tight or strained.

Relaying Strands. The process of building up a rope from single strands is called laying a rope; and the process of twisting together strands that have become untwisted,

relaying. The most satisfactory method of relaying strands is that illustrated in Figure 1. The rope should be held firmly in the left hand, and the thumb placed upon one of the strands, as shown in the illustration. Strand No. 1 is then twisted tightly with the right hand and pulled snugly into its place in the rope. Before loosening the hold upon the strand with the right hand, the thumb of the left is pressed upon this twisted strand at *x*. The next step is to grasp strand No. 2 with the right hand, twist it tightly, lay it in place above No. 1, and hold it with the thumb of the left

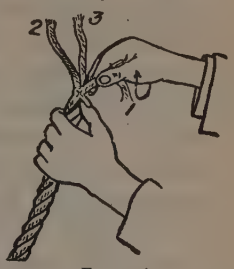


FIGURE 1
RELAYING STRANDS

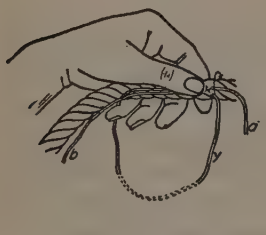


FIGURE 2

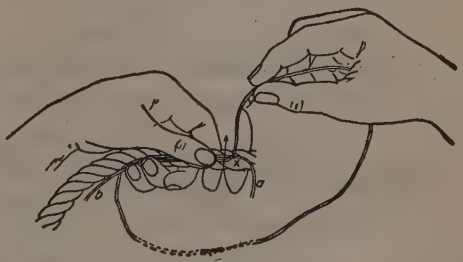


FIGURE 3
THE BEGINNING OF THE "WHIPPING"

hand just above the point *x* on No. 1. Strand No. 3 is treated in the same manner as Nos. 1 and 2, and the process is continued until the desired length of rope is relaid. If the work is properly done, the rope may assume its original condition.

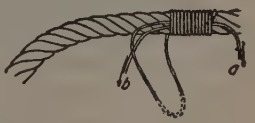


FIGURE 4

WHIPPING.—Binding the end of a rope with twine so that it will not unravel is called whipping. Ropes that are to be passed through pulley blocks, halter ropes, and the ends of strands used in making splices are usually finished in this way.

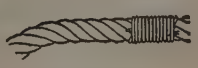


FIGURE 5
THE FINISHED "WHIPPING"

Secure a piece of string about three feet long and place it on the rope, allowing the end *a* to hang loosely over the end of the rope about two inches. Now make a loop by passing the other end of the string, *b*, down the rope and allowing a loose end of about two inches. Grasp the rope with the left hand in such a manner that the thumb can be placed on both strings as at *x* in Figure 2. Then, with the right hand, grasp the loop of the string at *y* and wrap it down the rope over itself and the other strand (Figure 3). Continue the wrapping as far as desired (one-half inch or more), then draw up the loops and tighten the tie by pulling on the ends *a* and *b* (Figure 4). If the string is wrapped firmly and closely, when complete it should appear as in Figure 5.

Knots

Overhand Knot.—The overhand knot is the simplest knot made. It is very important, however, since it forms a part of many other knots. It is made by simply making a loop in the rope and passing one end, as *a*, through the loop, thus forming the right-hand knot, as shown in Figure 6. If the loop at *x* is made to pass behind *b*, the end *a* will pass through the loop from this side and will form the left-hand knot. The overhand knot is used principally in connection with other knots and in making hitches and splices. Used alone, it will draw tight.

Figure 6
OVERHAND KNOT

Binder Knot.—This is the simplest method of joining two ropes and is the knot tied by all automatic binding attachments on grain-harvesting machines. The knot is made by placing the two rope ends side by side and tying an overhand knot. It will not slip,

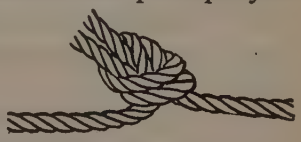


Figure 7
BINDER KNOT

but when tightly drawn is difficult to untie (Figure 7).

Blood Knot.—If, in making the overhand knot, the end of the rope is passed through the loop two, three, or four times (Figure 8) before pulling it taut, the double, treble, or fourfold knot is obtained (Figure 9). This is a larger knot than the

FIGURE 8
BLOOD KNOT

FIGURE 9
BLOOD KNOT

overhand and is often used on thongs or whips, being termed the blood knot.

Square or Reef Knot.—The commonest knot for joining the ends of two ropes, and probably the knot that is most often made, is the sailor's true knot or reef knot. In making it, care should be taken not to make a granny knot. (See description of granny (Figure 12).

First tie the right-hand form of the overhand knot (Figure 10), then across the strands (*a* in front of *b*), and tie the left-hand overhand knot. Notice that the ropes leave the loop together (Figure 11). The square

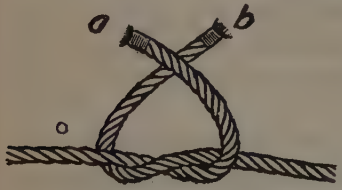


FIGURE 10
SQUARE KNOT

FIGURE 11
SQUARE KNOT

knot can be easily and quickly tied, it is easily untied, and is secure and reliable except when made with ropes of different sizes. The ease with which the knot can be tied and untied makes it very useful in reefing sails, and its smoothness and secure character makes it of use to the farmer in fastening the ends of binder twine when threading the binder.

Granny or Lumber's Knot.—This knot is often improperly used for the square knot and is of little value because it slips easily. The first step in making the knot is similar to that in making the square knot (Figure 10), but in completing it, the strand *a* passes behind the strand *b* before it is passed through the loop. Notice in Figure 12 that the ropes

FIGURE 12
GRANNY KNOT

FIGURE 13
HITCH FROM GRANNY KNOT

are on opposite sides of the loop. When the knot is drawn out of its correct form it assumes the shape of a hitch, as shown in Figure 13. This kind of hitch slips easily, which explains why it cannot be safely used.

Granny Knot with the Ends Whipped.—The granny knot is often used in tying large ropes together. In this case, however, the ends should be whipped to the standing part with strong twine (Figure 14). This prevents the knot from untying as well as from drawing tight.

FIGURE 14
GRANNY KNOT WITH ENDS WHIPPED

Surgeon's Knot.—The surgeon's knot is a modified form of the square knot. But instead of making but one twist, as in Figure 10, the left end *b* is wrapped twice about the other rope (Figure 15). The string or rope is then pulled up tight and the wraps are jammed closely together by swinging the hands until the wrists cross while still pulling. This holds the knot securely until the second

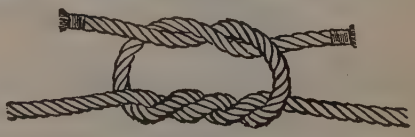


FIGURE 15
SURGEON'S KNOT

part can be tied. As the name implies, the surgeon's knot is used in surgical operations.

Weaver's Knot or Sheet Bend.—This knot is easily made, is easily untied, and never draws tight. Place the two ends of the rope together, the right *a* under the left *b* (Figure 16). Hold the two in place with the left hand, and with the right

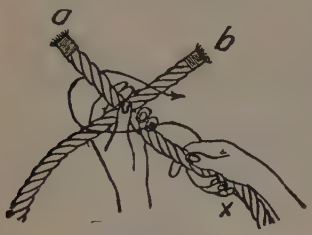


FIGURE 16

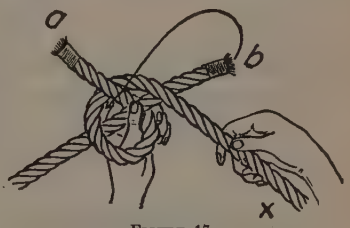


FIGURE 17

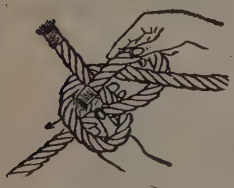


FIGURE 18

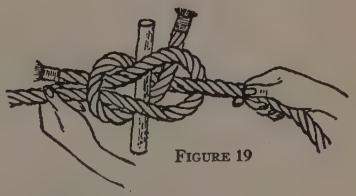


FIGURE 19

WEAVER'S KNOT

hand holding the rope at *x*, pass it around the end *a*, as shown in Figure 17. Release the right rope at *x* (Figure 17), and with the right hand, pass the end *b* through the loop, as shown in Figure 18. The knot is completed by pulling on the ropes as indicated in Figure 19. By inserting a wooden stick or "toggle" into the knot, as shown in Figure 19, it may be more easily untied.

Figure 8 Knot.—This knot is made by making a loop in the rope by passing the end *a* over the standing part *b* at *x*, as shown in Figure 20. The end *a* is then passed beneath the

standing part *b* and is brought back through the loop *y*. It is drawn taut by pulling on the standing part (Figure 21).

FIGURE 20

FIGURE 21

FIGURE "8" KNOT

The knot is used on the ends of ropes to prevent them from slipping through a pulley or hole.

Flemish Knot.—Ropes are often tied together by laying the two ends side by side and making the Flemish knot (Figure 22). This knot is made in the same manner as the figure eight (Figures 20 and 21).

FIGURE 22

FLEMISH KNOT

FIGURE 23

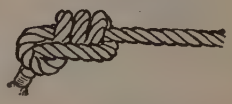


FIGURE 24

STEVEDORE KNOT

Stevedore Knot.—The stevedore knot, like the figure eight, is used to prevent ropes from pulling through pulleys or holes. It is made in the same manner as the figure eight, but instead of making one turn around the standing part *b*, three turns are made, as shown in Figure 23. The end is then passed back through the loop as shown by the direction of the arrow in Figure 23. The standing part of the rope *b* is then drawn until the loop *x* is taut (Figure 24).

Bowline Knot.—The bowline is without question the most useful and most important of the different knots. It is easily tied, will not slip nor draw tight and may be easily untied. It is used in fastening animals, in the hay field or stacking

outfits, in tying hay ropes, and in fact in any place where a permanent knot that is easily untied is wanted. Sailors use it in mooring their ships; hence the name bowline, from the line fastened to the bow of the vessel.

(1) Bowline—Beginner's Method. The knot is made by passing the end of the rope, as *a*, through a ring or around a post. A loop or half hitch is then made in the standing part of the rope about two feet from the end *a* (Figure 25). The end *a* is then brought through the loop *b* from the upper side as shown in Figure 26. Next, the end *a* is passed over the standing part of the rope at *c*, as in Figure 27, and is then passed back through the loop *b*. Figure 28 shows the completed knot drawn taut.

FIGURE 25 FIGURE 26

BEGINNER'S BOWLINE KNOT

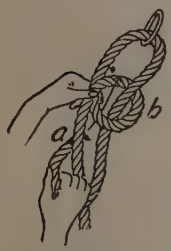


FIGURE 27 FIGURE 28

BEGINNER'S BOWLINE FINISHED

(2) Bowline—Boy's Method. Placing the rope through a ring or around the object to which it is to be tied, lay both hands, palms down, on the standing part of the rope as in Figure 29. With a twist of the right hand make a loop or half hitch *b*, as shown in Figure 30. Now, with the left hand, pull the standing part of the rope *c* through the half hitch *b*, making a loose slip knot (Figure 31). Bring the end *a* through the loop of the slip knot *d* and fold it back upon itself, holding it firmly with the right hand as in Figure 32. With the left hand on the standing part of the rope, give a

quick jerk in the direction indicated by the arrow and the knot is completed (Figure 33).

(3) Bowline—Overhand method. With the right hand on the end of the rope and the left on the bight in the position

FIGURE 29

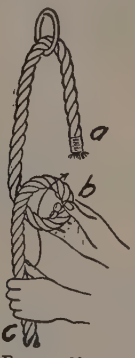


FIGURE 30

FIGURE 31

FIGURE 32

FIGURE 33

BOY'S BOWLINE KNOT

as shown in Figure 34, make a loop by bringing the left hand around the end of the rope as indicated by the direction of

FIGURE 34

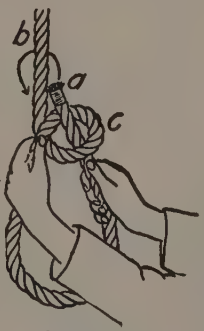


FIGURE 35

FIGURE 36

FIGURE 37

OVERHAND BOWLINE KNOT

the arrow in Figure 34 and shown in Figure 35. Now, with the left hand, hold the loop in place. Grasping the end of

the rope *a* with the right hand, bring it around beneath the standing part (*b*, Figure 36), and back through the loop *c* as in Figure 37. This is the quickest and easiest method of making the bowline knot.

Teamster's Hitch.—The teamster's hitch is a modified form of the bowline and is given here because it is often misused for that knot. Unlike the bowline, it draws tight and is difficult to untie. Fasten the rope to the object to which it is to be tied. Then make a loop or half hitch in the rope (Figure 38),

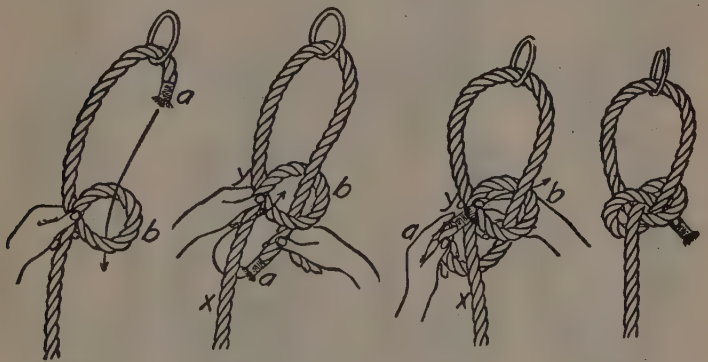


FIGURE 38 FIGURE 39 FIGURE 40 FIGURE 41

TEAMSTER'S HITCH

and bring the end *a* through the loop from the upper side (Figure 39), as in starting the bowline. But instead of bringing the end over the standing part of the rope at *x*, as in the case of the bowline, it is passed under the rope *x*. In other words, it is passed around the loop where the ropes cross, as at *y* in Figure 40. The end *a* is then passed down through the loop *b* as indicated by the arrow in Figure 40. The completed knot is shown in Figure 41.

Bowline on the Bight. This knot is made in the middle of a long rope or at the end of a rope when it has been doubled. The steps in beginning it are the same as those used in making the bowline (see description of bowline, overhand method,

Figures 34 to 37), except that a double rope is used. Figure 42 shows the first step. A loop is then made about the end *a* with the left hand, as shown in Figure 43. The end *a* should now be pulled through the loop *x* far enough so that it may be drawn downward as indicated by the arrow. The loop *a* is now slipped over the large loose loop *b* as indicated in Figure 43, and then carefully moved back (Figure 44), until it is in

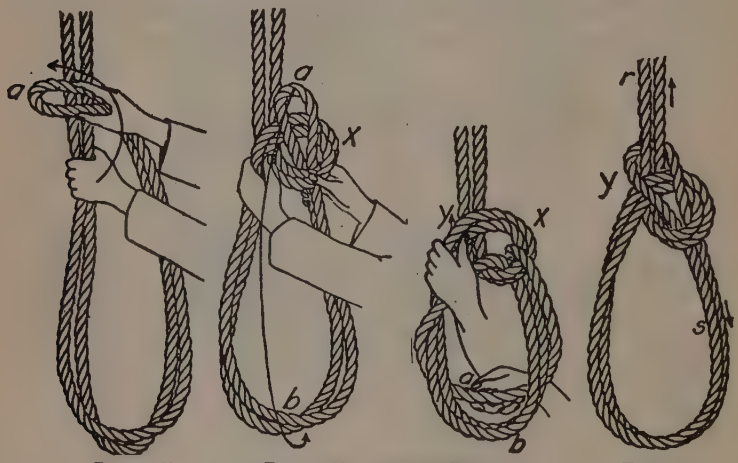


FIGURE 42 FIGURE 43 FIGURE 44 FIGURE 45

BOWLINE ON THE BIGHT

the position of *a* in Figure 45. In tying the knot care should be taken to prevent the half hitch or loop *x* from losing its form. This can be done by holding the ropes together where they cross at *y*. To tighten the knot pull carefully on the ropes at *r* and *s* in the direction of the arrows (Figure 45). The bowline on the bight, while not as important as many other knots, is especially useful in throwing horses and cattle. It is safe because it will not slip nor draw tight and is easily untied. Its use is further described under "tackles for throwing horses and cattle."

Spanish Bowline.—This knot may be made in the middle

of a long rope or in a loop at the end of the rope. It forms two single loops that will hold without slipping when used either separately or together. The knot is easily untied.

Form a bight in the rope (Figure 46), and with the right hand, fold it under the ropes as at *b*, thus forming two loops

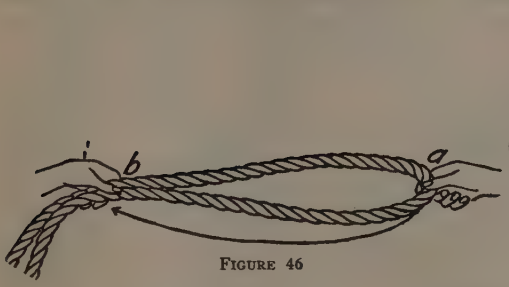


FIGURE 46

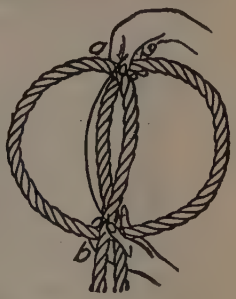


FIGURE 47

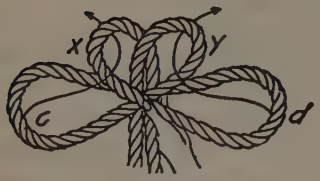


FIGURE 48

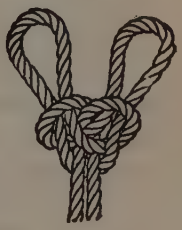


FIGURE 49

SPANISH BOWLINE KNOT

(Figure 47). Cross the two loops of the bight as shown in Figure 47 and with the right hand grasping the crossing *a*, fold these loops over on the part *b*, forming four smaller loops as shown in Figure 48. Holding the loops thus formed with the left hand, pass the loops *c* and *d* through the smaller loops *x* and *y*, each on its respective side as indicated by the arrows. Pull the loops through and the knot is finished (Figure 49). The knot is easily made if care is taken not to let the loops slip or lose their form.

Carrick Bend.—For tying ropes together no better knot can be used than the carrick bend, as it is quickly and easily tied. It is secure and does not draw tight. The carrick bend is often used as a fancy knot in braids or bands. In making the knot lay the end of the rope *y* under the standing part *a* to form a loop as shown in Figure 50; pass the other end of the rope *b* under the loop *x*, over the standing part at *a* and under

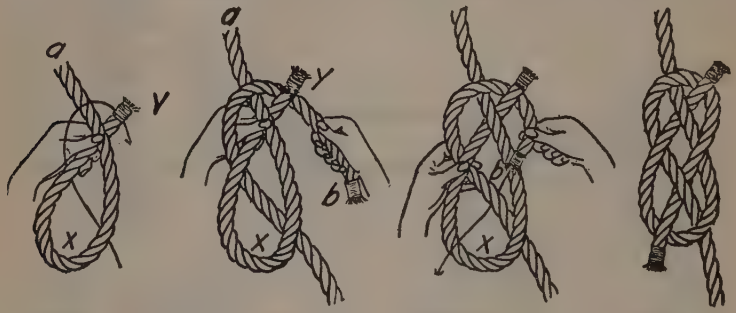


FIGURE 50 FIGURE 51 FIGURE 52 FIGURE 53

CARRICK BEND

the end *y*, as shown in Figure 51. Holding the ropes firmly in position, push the loop *b* through the loop *x*, as shown in Figure 52, making a slight loop. Then pass the end of the same rope *b* between the raised loop of *b* and the loop *x* as indicated by the arrow in Figure 52 and illustrated in Figure 53. If the standing parts of the rope are pulled, a modified form of the knot will be the result (Figure 54). This form of the carrick bend is sometimes called the double bowline.

FIGURE 54

DOUBLE BOWLINE

Harness Knot.—This knot is used by seamen in making knots in a towline because it can be easily tied and untied and does not seriously weaken the rope. It is made by first making a simple slipknot, drawing the loop through only a short distance, as illustrated in Figure 55.

The lower part of the loop x is then passed between the bight and the side of the loop, as indicated by the arrow

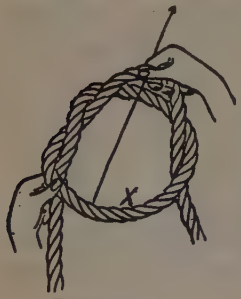


FIGURE 55

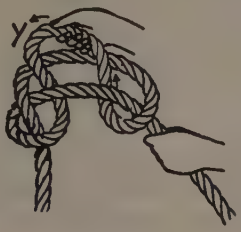


FIGURE 56

FIGURE 57

HARNESS KNOT

in Figure 55 and shown in Figure 56. In drawing up the knot it is necessary to hold it firmly against some object

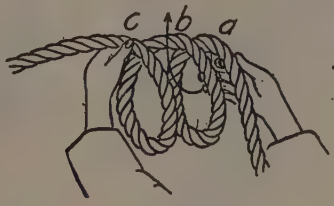


FIGURE 58

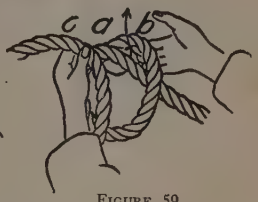


FIGURE 59

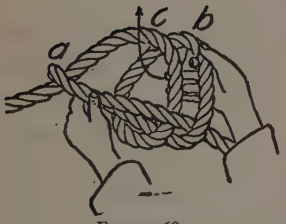


FIGURE 60

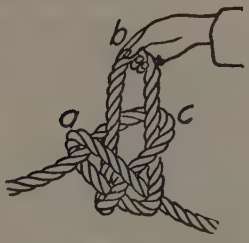


FIGURE 61

FIGURE 62

FARMER'S LOOP

and pull on the part of the loop y in the direction indicated by the arrow. Figure 57 shows the knot completed.

Farmer's Loop.—The farmer's loop can be tied in the middle

of a rope when both ends are fastened. It is easily tied and easily loosened. Make two turns in the rope and hold it in position as indicated in Figure 58. Pass the loop *a* under the loop *b* and up between *b* and *c*, as shown in Figure 59. Next pass the loop *c* under the loop *a* as indicated in Figure 59 and shown in Figure 60. Now pass the loop *b* under the loop *c* and up between *a* and *c*, as indicated in Figure 60 and as shown in Figure 61. Tighten the knot and it is complete (Figure 62).

Slip Knot.—The slip knot is one of the common knots. It can be easily and quickly made by catching the bight of the rope with the right hand, as in Figure 63, and then by giving

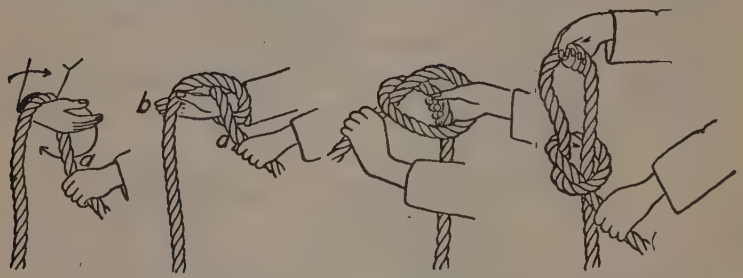


FIGURE 63 FIGURE 64 FIGURE 65 FIGURE 66

SLIP KNOT

the hand a turn in the direction indicated by the arrow in such a manner as to catch the end *a* over the wrist as in Figure 64. Grasp the bight of the rope at *b*, Figure 64, and pull it through the loop as in Figure 65. Figure 66 shows the completed knot.

Manger Knot.—The manger knot, as the name implies, is most commonly used in tying halter ropes to a ring or post. It is easily made, is secure when properly tied, and can be loosened by a simple jerk of the hand. To make the knot, pass the rope around the post so that the short end will be in the right hand. Grasp both ropes with the left hand (Figure 67), and with the right throw the short end *a* across both ropes in front of the left hand as indicated by the direction of

the arrow (Figure 67). Now with the right hand reach through the loop or bight *x* thus formed (Figure 68), and pull the rope through, tightening it and forming another loop (Figure 69). The end of the rope is now thrown over the standing part and passed through the loop as shown in Figure 70. The knot is sometimes incorrectly made by passing the end through the loop

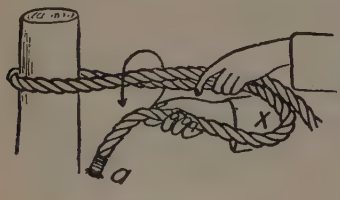


FIGURE 67

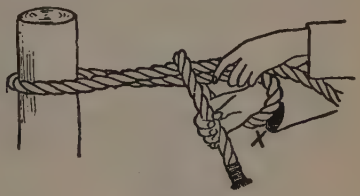


FIGURE 68

FIGURE 69

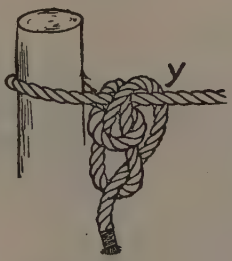


FIGURE 70

MANGER KNOT

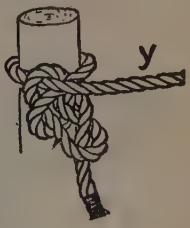


FIGURE 71

(Figure 71) without first passing it around the standing part of the rope *y*. In this case when the loop is drawn down tightly there is difficulty in untying the knot. There is also a right and wrong way in tying the knot when making a hitch to a smooth post. Figure 70 shows the knot in the correct position to the right of the post. In this position the pull will come on the knot, causing the loop around the post to tighten. Figure 71 shows the wrong position. The pull in this case, coming on the tie rope, opens the loop around the post and allows the hitch to slip down.

Halter Tie.—The halter tie is often used in fastening

animals. It is sometimes used instead of the bowline, but, unlike the bowline, draws tight and if not carefully made, it often slips. With the left hand on the standing part of the rope and the right hand holding the end, bring the short end down across the standing part of the rope as in Figure 72. Passing the end around the rope as indicated by the direction of the arrow (Figure 72), with the left hand grasp the standing

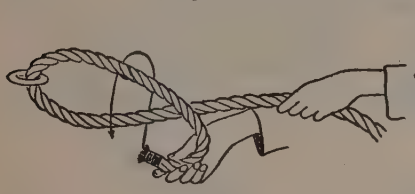


FIGURE 72

FIGURE 73

FIGURE 74

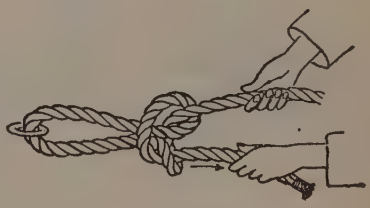


FIGURE 75

HALTER TIE

part of the rope at *x* as shown in Figure 73. Now pass the end beneath both ropes, as indicated by the direction of the arrow in Figure 73 and through the loop *y* formed by the left hand (Figure 74). In tightening the knot, draw on the short end first (Figure 75) or it may be pulled out of shape and two half hitches formed.

Emergency Knot.—The emergency knot is used for the same purpose as the bowline. It can be tied any place in a long rope without the necessity of drawing the end through the knot to be tied. When firmly drawn, the knot is difficult to untie.

In beginning the knot, the rope is held with the palms of the hands up, the end upon which the pull is to come in the right

hand (Figure 76). Throw two loops in the rope with each hand, as shown in Figure 77 by turning the hands in the direction of the arrows, as indicated in Figure 76. Now pass the loop x, held in the left hand, through the loop y in the right hand, so that it

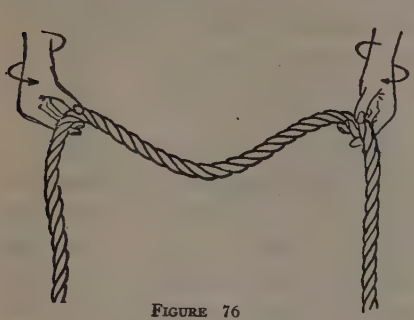


FIGURE 76

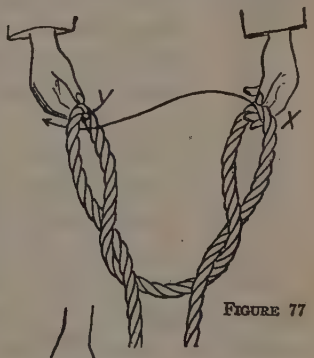


FIGURE 77

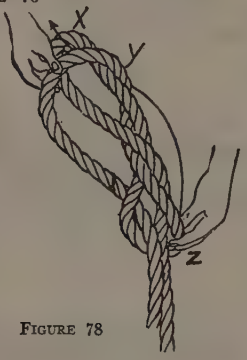


FIGURE 78

FIGURE 79

EMERGENCY KNOT

extends beyond the loop y about two inches, as shown in Figure 78. Holding the loops x and y with the right hand (Figure 78), grasp the loop z with the left hand and, in turn, pass it through the loop x held in the right hand as shown by the direction of the arrow in Figure 78. The knot is completed by pulling on the loop last formed and the standing part of the rope (Figure 79).

Fisherman's Knot.—The fisherman's knot derives its name from the fact that it is commonly used for joining silkworm gut on fishing tackles. In making it, the strands are laid together, and an overhand knot (Figure 80), is made with one end *a* around the other strand *b*. The strands are then turned end for end and another overhand knot made with the other end *b* around the first strand *a*. See the overhand knot (Figure 6).

FIGURE 80
FISHERMAN'S KNOT

Fisherman's Eye Knot.—This knot may be made by the method just described, or by another method somewhat more complicated but much quicker when learned. Make a bight in the rope (Figure 81). Then grasping the bight with the right hand at *x* lay it over on the two strands at *y*, thus forming two loops (Figure 82). Now cross the loops as in

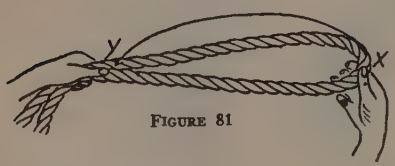


FIGURE 81

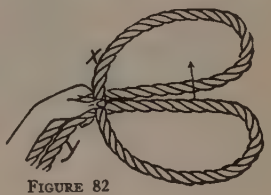


FIGURE 82

FIGURE 83

FIGURE 84

FISHERMAN'S EYE KNOT

Figure 83 and with the right hand draw the strand *x* down between the two ropes *y* and up through the loop *a*, as indicated by the arrow in Figure 83. Fig. 84 shows the knot completed.

Tom Fool's Knot.—The tom fool's knot, or double bow as

it is sometimes called, is a trick knot and yet at the same time it is very useful. It is commonly used in ringing hogs, one of the loops being placed around the upper jaw. It is tightened on the jaw by pulling the stranding part of the rope x, and untied by pulling the end of y (Figure 88).

To tie the knot hold the rope with the palm of the left hand

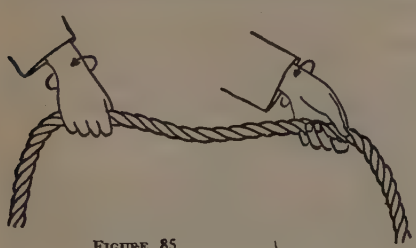


FIGURE 85

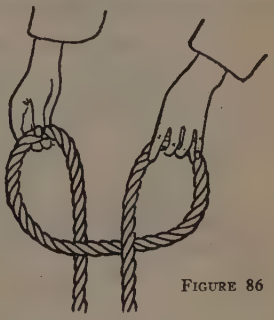


FIGURE 86

FIGURE 87

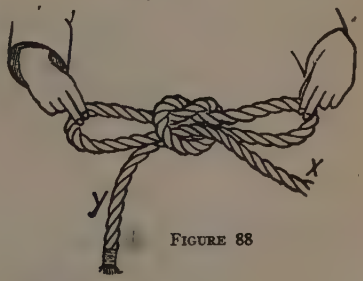


FIGURE 88

TOM FOOL'S KNOT

up and the palm of the right hand down (Figure 85). Now turn both hands toward the right, as indicated by the arrows in Figure 85 and shown in Figure 86, so that the palms will face each other. Holding the hands firmly in that position, bring the two loops together, as shown in Figure 87, so that they may be drawn through from opposite sides in the direction of the arrows. Releasing the hold upon the rope at x with the left hand, reach through the loop formed by x and grasp the rope y, and releasing the strand y with the right hand, reach through

the second loop, formed by *y*, and grasp the rope *x*, then pull the ropes through in opposite directions, forming a double loop. Figure 88 shows the completed knot.

Lineman's Rider—End Method.—Linemen, and especially telephone men, often use a knot which they term the lineman's rider. It is absolutely secure and will hold from any point upon which it may be drawn.

Doubling the rope, as shown in Figure 89, fold it back upon itself as indicated by the arrow, so as to form two loops (Figure 90). Now holding these loops in the left hand, with the right

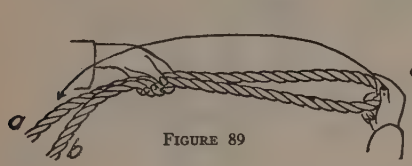


FIGURE 89

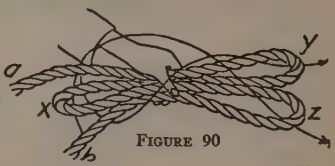


FIGURE 90

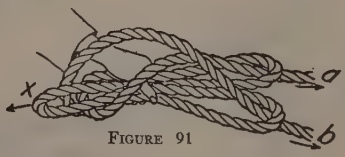


FIGURE 91

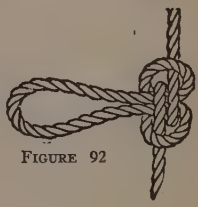


FIGURE 92

LINEMAN'S RIDER—END METHOD

bring the end *a* under the bight *x* and back through the loop *y* from the upper side, as indicated by the arrows in Figure 90 and shown in Figure 91. The other end *b*, is next passed under the bight *x* in the opposite direction and back through the loop *z* in the same manner as described for *a*. Tighten the knot by drawing on the bight *x* and the two ends *a* and *b*. The completed knot is shown in Figure 92.

Lineman's Rider—Loop Method.—Holding the doubled rope in the left hand, grasp the bight or loop with the right, and twist it one full turn, thus forming the loop *x*, as shown in Figure 93. Now with the right hand, grasp the loop at the crossing (Figure 94). Then with the left hand draw the loop *x*

between the two ropes at *y* as indicated by the arrow in Figure 94 and shown in Figure 95. Pass the loop *x* through the

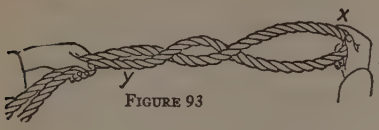


FIGURE 93

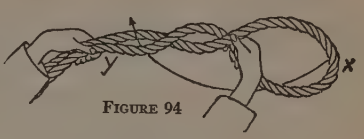


FIGURE 94

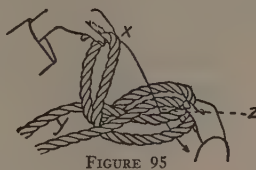


FIGURE 95

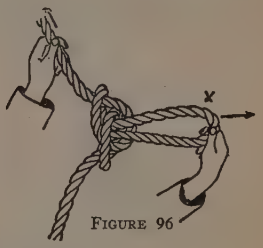


FIGURE 96

LINEMAN'S RIDER—LOOP METHOD

loop *z*, as indicated by the arrow in Figure 95, and tighten the knot by drawing on the loop *x* and the two ends (Figure 96).

Hangman's Noose.—The hangman's noose is made by making a double loop in the rope, as indicated in Figure 97. The end is then wound back (Figure 98) thirteen rounds over the loop and

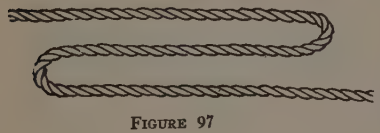


FIGURE 97

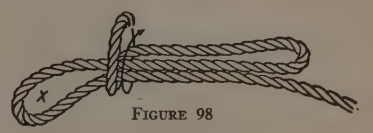


FIGURE 98

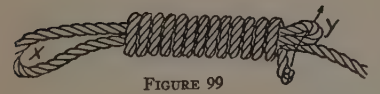


FIGURE 99

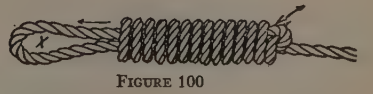


FIGURE 100

HANGMAN'S NOOSE

the standing part (Figure 99). The knot is completed by passing the end through the loop *y*, as shown in Figure 99, and drawing on one side of the noose *x* as indicated by the arrow in Figure 100.

Hitches

Half Hitch.—For temporarily fastening ropes when there is a steady pull, the half hitch is often used. Its chief use, however, is in connection with other knots or hitches. The half hitch is made by passing the end of the rope around the standing part and pinching it between the rope and the object to which it is attached (Figure 101).

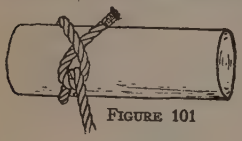


Figure 101

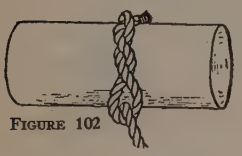


Figure 102

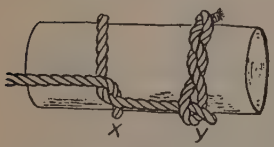


Figure 103
HALF AND TIMBER HITCHES

Timber Hitch.—The timber hitch is much more secure than the half hitch, and is often used by carpenters, foresters, and lumbermen in moving logs or timbers. It is, in part, a repetition of the half hitch, since the end, instead of being simply tucked under the rope, is wrapped about it once or more (Figure 102).

Timber Hitch and Half Hitch.—As the name implies, this hitch is a combination of the timber hitch and the half hitch. The two, when thus used together, make a more secure hitch than either alone, and are especially useful in lifting timbers, long pipes, pumps, or other long objects where a nearly straight end pull is desired. When the loops cannot be passed over the end of the object, the half hitch *x* should be made first. The end is then passed back to form the timber hitch *y* (Figure 103).

Magnus Hitch.—The magnus hitch is useful in securing a rope to a spar, as there is but little tendency for it to slip endwise. Pass the end of the rope around the spar in front of the standing part *x*, around the spar again on the other side of the standing part, and then through the bight *y* last formed (Figure 104).

Rolling Hitch.—A rolling hitch is made by wrapping the rope three times around the object to which it is to be fastened and then making two half hitches around the standing part. The hitch may then be hauled taut. It is very easily and quickly made and is secure (Figure 105).

Topsail Halliard Bend.—Figure 106 shows the topsail halliard bend completed but not drawn taut. Three turns are first made around the object to which the rope is to be fastened; it is then brought back around the standing part,

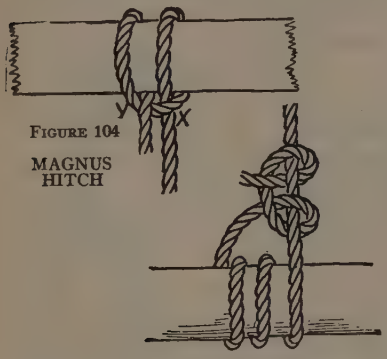


FIGURE 104
MAGNUS HITCH

FIGURE 105
ROLLING HITCH

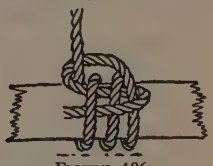


FIGURE 106
TOPSAIL HALLIARD

FIGURE 107
FISHERMAN'S BEND

through beneath the three wraps, back again over the last two wraps, and under the first.

Fisherman's Bend.—The fisherman's bend is used for permanently fastening the end of a rope to a ring or hook and is frequently used in fastening boats, hammocks, anchors, etc. The hitch consists of two turns around the ring and a half hitch completely around the standing part and the two turns (Figure 107). The end of the rope may be spliced into the standing part, or it may be simply whipped to the latter as in the illustration. The object of having the rope through the ring twice is to give it greater wearing surface.

Round Turn and Half Hitch.—The round turn and half hitch

has the same use as the fisherman's bend and is similar to it, with the exception that the half hitch is made only around the standing part of the rope (Figure 108).

Clove Hitch.—The clove hitch is the most used of any of the hitches, being the simplest, the most convenient, and the most secure method of fastening tent ropes, guy ropes, or other temporary stay ropes. It may be formed either in the

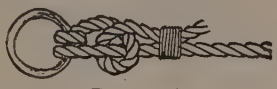


FIGURE 108
ROUND TURN AND HALF HITCH

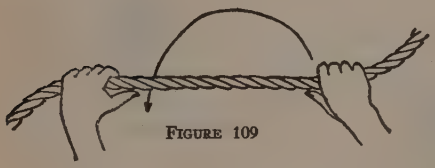


FIGURE 109

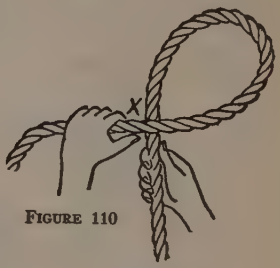


FIGURE 110

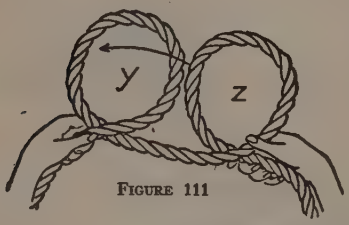


FIGURE 111

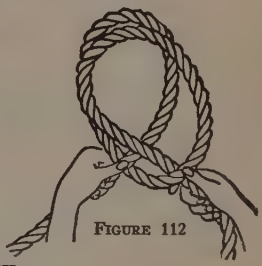


FIGURE 112

BEGINNER'S CLOVE HITCH

end or in the middle of the rope without access to the ends, and it will be secure with either end of the rope used as the standing part.

1. Clove Hitch—Beginner's Method. To make the hitch by this method the rope is held in both hands, as shown in Figure 109. The right hand is then made to describe a curve, as illustrated by the arrow (Figure 109), passing under the rope at *x*, Figure 110. Hold the half hitch in the left hand, as shown in Figure 111 and throw the second loop in the same

manner as the first (Figure 111). Slide the loop last formed *z* over the first *y*, as indicated by the arrow in Figure 111 and shown in Figure 112.

2. Clove Hitch—Sailor's Method. Oftentimes it is desirable to form a clove hitch where there is a pull on the rope.

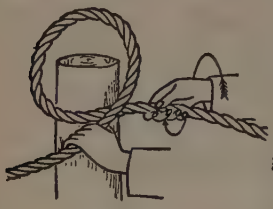


FIGURE 113

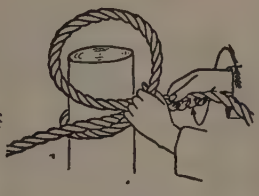


FIGURE 114

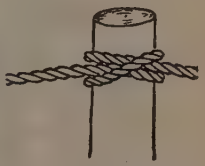


FIGURE 115

SAILOR'S CLOVE HITCH

This can be done by sustaining the weight with the left hand, as in Figure 113, forming a loop with the right hand, as illustrated in the beginner's method (Figures 109 and 110), and passing the loop over the top of the post. The end of the

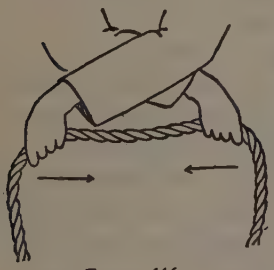


FIGURE 116

FIGURE 117

FIGURE 118

FARMER'S CLOVE HITCH

rope is then held in the left hand, and another loop, made with the right hand (Figure 114), is thrown over the post (Figure 115).

3. Clove Hitch—Farmer's Method. This method of making the clove hitch is the most practicable and the most commonly used. Crossing the arms, the left in front of the right,

grasp the rope, as indicated in Figure 116. Without twisting the rope, bring the hands to the position indicated in Figure 117. The hitch is completed by turning both hands to the right, as indicated by the arrows in Figure 117 and shown

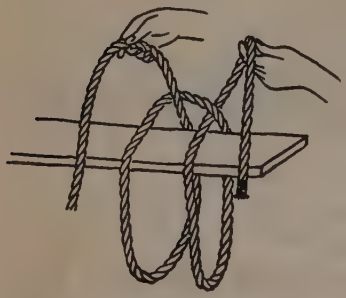


FIGURE 119

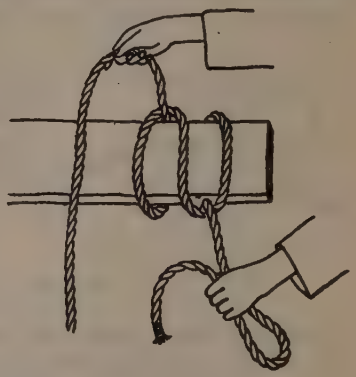


FIGURE 120

SCAFFOLD HITCH

in Figure 118. Both loops may then be held in the right hand.

Scaffold Hitch.—A very simple but satisfactory form for fastening scaffolds may be made by slightly modifying the clove hitch. Make a clove hitch of ample size so that when it is placed over the end of the scaffold the ends swing freely below it, as in Figure 119. The ropes are then tightened by being pulled in opposite directions to the edge of the plank, as shown in Figure 120. Turn the plank over, draw the ropes up, and fasten the short end to the standing part by a bowline knot (Figure 121). A scaffold hitch is made on the other end of the plank and the scaffold is ready for use.

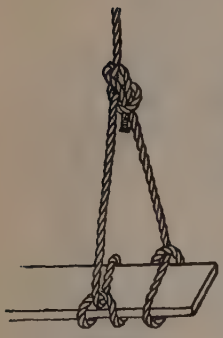


FIGURE 121
SCAFFOLD HITCH

Miller's Knot.—This knot is often confused with the clove

hitch, but while in many cases it is used for the same purpose, it is made in a different manner. The knot (really a hitch) is used by farmers and millers in tying grain and flour sacks,

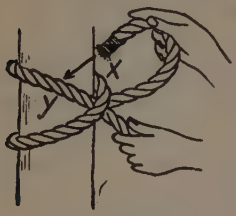


FIGURE 122

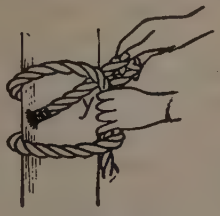


FIGURE 123

MILLER'S KNOT

FIGURE 124

and is also used in fastening ropes to long beams when the end of the beam cannot be reached.

Hold the standing part of the rope in the left hand while with the right pass the free end around the beam so that the loop crosses the rope *y* held in the left hand (Figure 122). The free end in the right hand is brought over the loop at *x* and under the standing part at *y*, as indicated by the arrow in Figure 122 and shown in Figure 123. When the strands are drawn the knot appears as in Figure 124.

FIGURE 125

FIGURE 126

TAUT LINE HITCH

Taut Line Hitch.—Very frequently, in using ropes or cables, there are occasions when it becomes necessary to attach one rope to another. For instance, when a strand in a rope breaks under the weight of a heavy load, it is often desirable to

relieve the tension at that point by fastening another rope above the break. Such a fastening can be made by using the taut line hitch.

Give the end of the rope two full turns about the taut rope, wrapping in the direction of the break (Figure 125), and drawing the wraps firmly and closely together upon the taut rope. Now pass the end over the two wraps, as indicated by the arrow in Figure 125, and wind it once more about the taut rope, completing the hitch by passing it through the loop thus formed (Figure 126). The hitch will not hold unless it is tied very firmly and tightened while the weight is being applied to the new rope. The taut line hitch is very useful in case of emergency, but it should not be used as a permanent fastening.

Running Hitch or Snubbing Hitch.—The taut line hitch, described in the preceding paragraph, forms the principal part

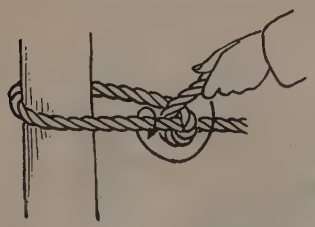


FIGURE 127

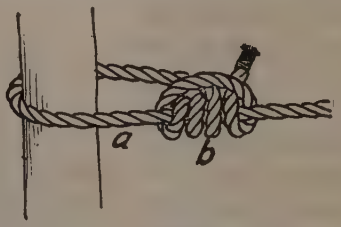


FIGURE 128

SNUBBING HITCH

of the running hitch which is used in snubbing animals. The animal can be easily held by simply throwing the rope around a post and holding to the free end which forms a half hitch around the rope to which the animal is fastened (Figure 127). By using the half hitch in this manner any slack can easily be taken up and, as easily, the animal can be given more rope. If a more permanent fastening is desired, the free end may be wrapped about the standing part, as indicated by the arrow in Figure 127 and the hitch then completed (Figure 128), as described for the taut line hitch in Figures 125 and

126. The running hitch will not slip in the direction of the pull, i.e., toward the post, but by taking hold with one hand at *a* and the other at *b* (Figure 128), it can be slid quite easily in the opposite direction and the slack thus quickly taken up. The running hitch should never be used as a permanent tie.

Sheepshank.—For shortening ropes of any size, either temporarily or permanently, there is no form of fastening that is

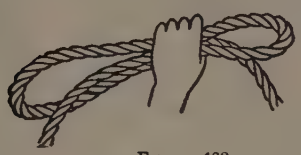


FIGURE 129

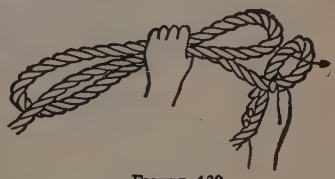


FIGURE 130

FIGURE 131

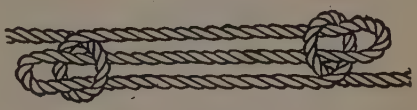


FIGURE 132

FIGURE 133

SHEEPSHANK

more satisfactory than the sheepshank. This hitch is made by grasping the rope in the left hand, then bringing it up with the right hand so as to form a loop large enough to reduce the rope to the desired length (Figure 129). The ropes are then held in the left hand, as in Figure 129, a half hitch is made with the right hand (Figure 130), and passed over the end (Figure 131). Reversing the rope, grasp the other end in the left hand, as shown in Figure 129 and complete the hitch as described in Figures 130 and 131. Figure 132 shows the temporary sheepshank completed. To make a permanent shortening, the ends are

passed through the bights or toggled, as shown in Figure 133. Sometimes the ends are whipped to the bights with binder twine, or else the overhand knot is used.

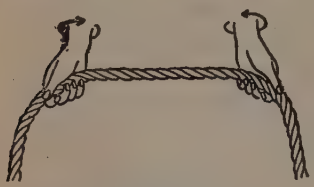


FIGURE 134
RACKING HITCH

Racking Hitch.—The racking hitch is often used by railroad men as a hook fastening for large ropes where heavy loads are to be lifted. In making the hitch, the rope is held in the hands, palms up, and two loops are formed by turning the hands in the direction of the arrows (Figure 134). The loops are each given a full turn and hung on the hook as shown in Figure 135.

FIGURE 135
RACKING HITCH

Catspaw.—The catspaw is a very satisfactory hitch and although a little more difficult to make than the racking hitch, it is more easily untied. With the long end of the rope toward the right side of the body, make a loop and grasp the ropes at the crossing with the left hand (Figure 136). With the right hand bring up the loop, as indicated by the arrow in Figure 136 and hold it with the left, as shown in Figure 137. Now with the right hand begin wrapping the long part of the rope over itself and the

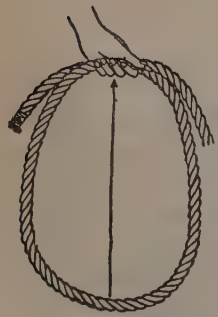


FIGURE 136

FIGURE 137

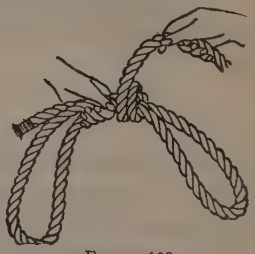


FIGURE 138

CATSPAW HITCH

other two ropes as shown in Figure 138. The loops are then adjusted until they are the same length and are then fastened (Figure 139).

Blackwall Hitch.—This is a simple, though satisfactory, temporary hitch that may be used with either a rope or chain when

FIGURE 139
CATSPAW HITCH

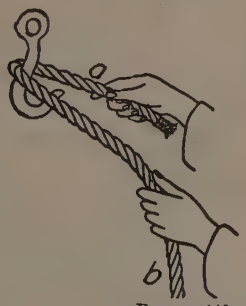


FIGURE 140 FIGURE 141
BLACKWALL HITCH

the pull is continuous. A bight is made in the rope and is passed behind the hook (Figure 140). The free end *a* is then passed through the hook and the standing part *b* passed over it from the opposite side (Figure 141).

Slippery Hitch.—The slippery hitch can only be used when there is a steady pull. Its value consists in the readiness with which it can be cast off in cases of emergency. A sharp pull on the end of the rope loosens it. The method of making the hitch may be seen from the illustration (Figure 142).

FIGURE 142
SLIPPERY HITCH

FIGURE 143
MARLINSPIKE HITCH

Marlinspike Hitch.—This hitch is made by beginning a simple slip knot. But instead of drawing the loop through and tightening the knot, the loop is only drawn through far enough so that a marlinspike can be placed in position to hold it, as in

Figure 143. This hitch is used only as a means of getting a purchase on the seizing stuff when serving a rope.

Regulating Lashing.—A regulating lashing is very convenient on ropes where the tension needs frequent changing. It is often used on tent ropes, but may be used on any sort of guy rope where the tension is not too great. The rope is tightened by slipping the wooden block *x* in the direction of the pull (Figure 144).

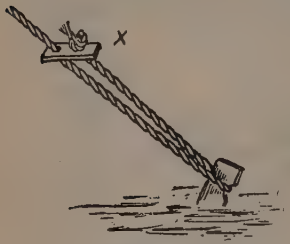


FIGURE 144
TENT ROPE LASHING

ROPE END KNOTS

The Crown Knot.—The crown knot, while in itself not a complete and permanent fastening and of small value when used alone, is nevertheless very important as the basis of rope-end splices.

To make the knot, unlay the end of the rope far enough so that the knot or splice, if a splice is to be made, may be com-

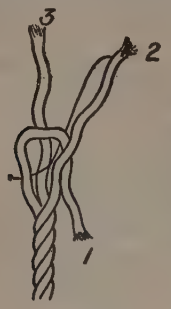


FIGURE 145

FIGURE 146
CROWN KNOT

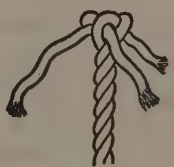


FIGURE 147

pleted, then bring strand No. 1 down between strands Nos. 2 and 3, forming a loop, as shown in Figure 145. Pass strand No. 2 across the loop thus formed, as shown by the arrows in Figure 145, so that it will lie between the loop and strand No. 3.

Strand No. 3 is now passed through the first loop, as indicated in Figure 146 and shown in Figure 147. Pull the crown down tightly by pulling gradually on each of the strands.

Wall Knot.—Among the different forms of rope end-fastenings that are easily and quickly made, the wall knot is the most commonly used.

For a small rope unlay the strands about three inches. Hold the rope in the left hand, with the loose strands upward. With

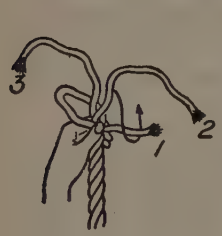


FIGURE 148

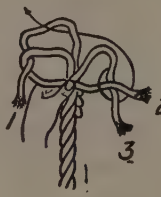


FIGURE 149

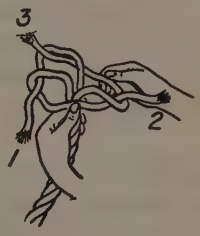


FIGURE 150

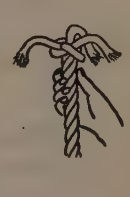


FIGURE 151

WALL KNOT

the right hand grasp the end of strand No. 1 and bring it across the rope, forming a loop and allowing the end to hang free, as shown in Figure 148. Hold the loose end in position with the thumb of the left hand. Grasp strand No. 2, pass it under strand No. 1, as indicated by the arrow in Figure 148, and hold it against the rope with the thumb of the left hand (Figure 149). Again with the right hand, grasp strand No. 3, pass it under strand No. 2 and up through the first loop formed as indicated by the arrow in Figure 149 and shown in Figure 150. Draw each of the strands gradually until the knot is tight (Figure 151).

FIGURE 152

FIGURE 153

WALL AND CROWN KNOT

Wall and Crown Knot.—A more secure fastening than the wall knot is made by first making the wall knot (see description of wall knot, Figures 148, 149, 150, and 151), then finishing

with the crown, as shown in Figure 152. (See description of crown knot, Figures 145, 146, and 147.) The two knots are drawn together, as shown in Figure 153.

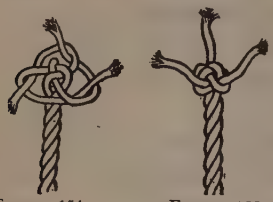


FIGURE 154 FIGURE 155
MANROPE KNOT

Manrope Knot.—This knot is just the reverse of the wall and crown knot. The crown knot is made first (Figure 154), and the wall knot drawn down over it (Figure 155). See description of the wall knot, Figures 148, 149, 150, and 151 and also of the crown knot illustrated in Figures 145, 146, and 147.

Matthew Walker Knot.—This is one of the most permanent of the knots and at the same time one of the most difficult to tie. It can be most easily made by loosely constructing the wall knot, as shown in Figure 156 (see also wall knot, Figures 148, 149, and 150), then continuing as follows: Pass the end *a* through the loop with *b*, the end *b* through the loop with *c*, and *c* through the loop with *a* as indicated by the arrow in Figure 156. Tighten the knot gradually by drawing each of the ends (Figure 157).

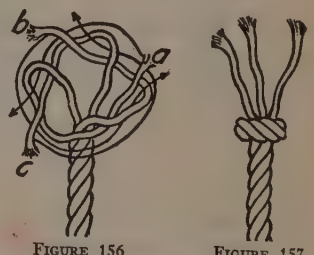


FIGURE 156 FIGURE 157
MATTHEW WALKER KNOT

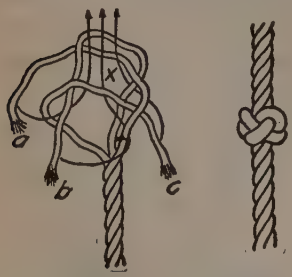


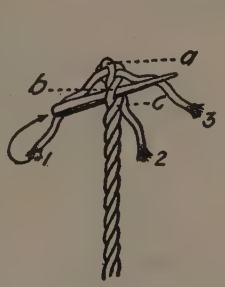
FIGURE 158 FIGURE 159
DIAMOND KNOT

Diamond Knot.—This knot is very satisfactory when tied in the end of a rope, but is most generally used as an ornamental knot at some distance from the end. In this case it is necessary to unlay the ends farther down the rope, the strands being relaid again when the knot is completed.

In beginning the diamond knot, a crown knot is first made as described in Figures 145, 146, and 147. The strands are not drawn down tightly but should be arranged loosely, as shown in Figure 158. The end *a* is then passed around the loop of the next strand *c* and up through the center at *x*; similarly, *b* is passed around *a*, and *c* around *b*, each passing through the center *x*, as indicated by the arrows. When tightening the knot, it is necessary to tighten the crown knot at the base first. If the knot is tightened by drawing on the ends first, it will be drawn away from the twisted strands of the rope. Figure 159 shows the diamond knot as it looks when completed.

Splices

End or Crown Splice.—The end splice is a permanent fastening used on the end of a rope to prevent it from unraveling. The first step in making the splice is that of making the crown knot which is described in Figures 145, 146, and 147. The second step consists in splicing back the loose ends. Strand No. 1 is passed over the nearest strand *a* on the main rope and under the second *b* in a diagonal direction, almost at right angles to the twist of the strands (Figure 160). Strands No. 2 and No. 3 in turn, are in like manner spliced back, No. 2 over *b* and under *c*, and No. 3 over *c* and under *a*. Each strand is tucked under but one strand of the main rope at a time (Figure 161). To make a smooth, tapering splice, cut out a portion of the fibers after each tuck and, when finished, pound the splice lightly with a short stick or hammer and roll it on the



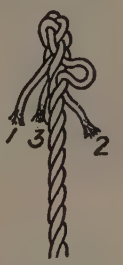


Figure 160 Figure 161 Figure 162

END OR CROWN SPLICE

floor under the foot (Figure 162). In splicing ropes, a smooth, pointed, hard wood stick or marlinspike is very convenient in raising the strands.

Loop Splice.—The loop splice, although seldom used, except in making rope halters, may be made at any point in the rope. It is simply a permanent loop through which another rope or some part of the same rope is to pass.

In making the loop splice for a halter, raise two strands, as shown in Figure 163, passing the long end *a*, or lead rope,

FIGURE 163

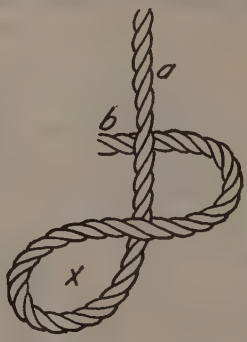


FIGURE 164

FIGURE 165

LOOP SPLICE

under the strands thus raised in such a manner that when the loop *x* is drawn to the desired size the rope *a* will pass through beneath the two strands at right angles to the direction in which they are laid. This is very important, for if the long end *a* is passed under the raised strands in the direction indicated by the dotted line, the loop splice, when completed, cannot be properly drawn up. To complete the splice, raise two strands in the long part of the rope, as indicated by the marlinspike (Figure 163), and pass the short end through (Figure 164). Draw the ropes closely together, as in Figure 165.

Eye Splice or Side Splice.—The eye splice is used both in making halters and in splicing one rope to another.

Untwist the end of the rope and place the strands in position, the two outside strands straddling the main rope and the middle or top strand running along the top of the rope. Now, with the marlinspike raise any one of the strands, as *a*, and pass the center strand No. 1, under it, diagonally to the right (Figure 166). Turn the main rope toward the left and pass strand *b* lying next to it (Figure 167). Now, in order to pass strand No. 3 under strand *c* so that it will be diagonal to the strands of the main rope, it will be necessary to bring the rope

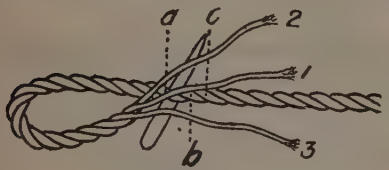


FIGURE 166

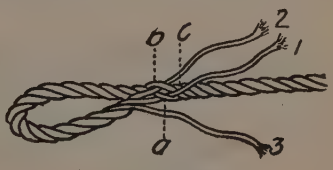


FIGURE 167

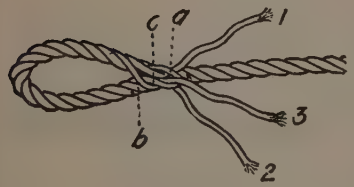


FIGURE 168

FIGURE 169

EYE SPLICE

to the position in which it was first held. Then raise strand *c* of the main rope and be particular that strand No. 3 passes under it from the lower side so that the end comes out where strand No. 1 entered (Figure 168). Each loose strand should now pass under but one strand of the main rope. No two should be under the same strand and no two should come out from between the same two strands. Complete the splice by splicing in the strands as described for the end splice (Figures 160, 161, and 162). Figure 169 shows the splice complete.

Short Splice.—To join two ropes together where there is a

straight pull and where they are not required to pass through pulleys, the short splice is often used.

In making the splice, the ends of the two ropes are unlaid for a sufficient distance and the two ends then locked together so that those from one end pass alternately between those from the other end (Figure 170). Notice that the strands from opposite sides are in pairs. Then, taking two strands from opposite sides, as the pair *a* and No. 1, tie the simple overhand

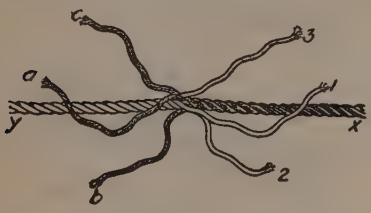


FIGURE 170

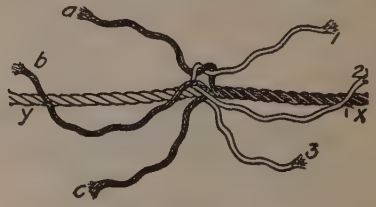


FIGURE 171

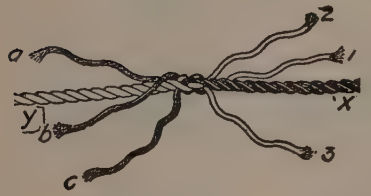


FIGURE 172

FIGURE 173

SHORT SPLICE

knot in its right hand form, as shown in Figure 171. (See overhand knot, Figure 6.) Similarly, with the right hand knot tie together the strands forming the pairs *b* No. 2 and *c* No. 3. Draw the knots tightly, then, passing each strand of the rope *x* diagonally to the left, tuck the ends under the strands of *y* as described for the end splice in Figures 160, 161, and 162. Turn the rope end for end and in the same manner splice down the strands of the rope *y* (Figure 172). Splice down the strands alternately, and each strand but one place each time. When the splice is completed, each strand from both ropes should be spliced under at least two places (Figure 173). The length of

the splice must depend upon the size of the rope and the load to be placed upon it. This splice may be made without tying the overhand knots by simply splicing under the strands.

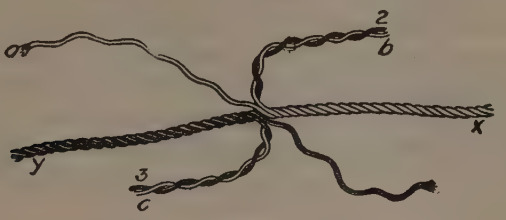


FIGURE 174

FIGURE 175

FIGURE 176

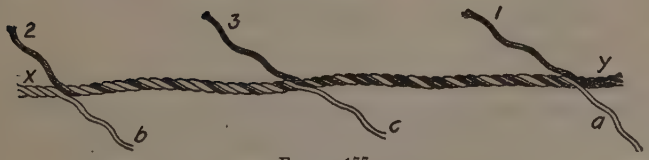


FIGURE 177
LONG SPLICE

The Long Splice.—Every farmer, in fact every person who has occasion to use rope, should learn to make the long splice. It is easily made, is as secure as any other part of the rope,

and leaves it so nearly its original size as not to impair its use through pulleys.

To make the splice, first unlay the strands of the rope. A three-eighths inch rope will require a free end of about eighteen inches, a one inch rope about thirty-six inches, and larger ropes in proportion. Now lock the strands of the two ropes together as in beginning the short splice, in such a manner that the strands from one end pass alternately between the strands of the other end, forming the pairs, *a* No. 1, *b* No. 2, and *c* No. 3 (Figure 170). At this point care should be taken that the

FIGURE 178

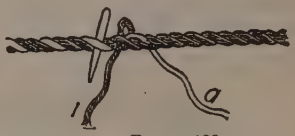


FIGURE 180

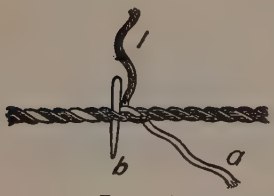


FIGURE 179

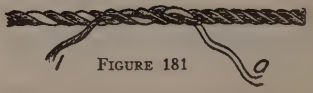


FIGURE 181

FINISHING THE LONG SPLICE

strands are properly paired, for a mistake here cannot be detected until the splice is completed and means that the work must be repeated.

The strands from any two of the pairs, as *b* No. 2 and *c* No. 3, are now twisted together, leaving the other pair, as *a* No. 1, free (Figure 174). Unlay strand *a* one turn from its rope *x* and follow it by relaying strand No. 1 in its place, drawing it firmly and keeping it twisted tightly. Continue until six or eight inches from the end of the relaid strand (No. 1), depending on the size of the rope (Figure 175).

Turn the rope end for end and untwist either pair of the

twisted strands, as *b* No. 2 (Figure 175). Proceeding as before, unlay strand *b* from its rope *x* and relay strand No. 2 in its place (Figure 176). Now untwist the last pair *c*, No. 3. The rope should now appear as in Figure 177, the breaks should be separated the same distance and each strand coming from the left, *x* should be placed in front of the strand from the right *y*, so that they cannot untwist without uncrossing. To cross

FIGURE 182
LONG SPLICE FINISHED

the strands otherwise, as *a* behind No. 1, a mistake often made, the splice cannot be properly completed.

The splice is completed as follows: With the ends properly crossed (as described in Figure 177), tie the right hand overhand knot (Figure 178; see also Figure 6), and draw it down firmly into the rope (Figure 179). The end (No. 1) is now

FIGURE 183

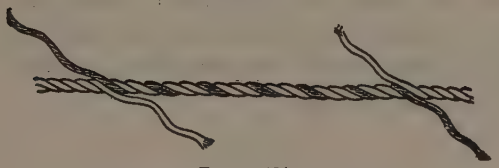


FIGURE 184
MENDING BROKEN STRANDS

spliced down by being passed over the first strand *a* and under the second *b*, as shown by the marlinspike in Figure 179, then over the third *c* and under the fourth *a*, as shown in Figure 180. Draw down the end No. 1 and cut it off, leaving it one-quarter inch long (Figure 181). In identically the same manner, splice down and cut off each of the remaining strands *a*, *b*, *c*, No. 2, and No. 3. The splice is finished by pounding down the

uneven parts and rolling it on the floor under the foot (Figure 182).

Mending Broken Strands.—It is often desirable to mend a broken strand (Figure 183), or even to remove a portion of a rope that is badly worn or frayed. In either case unlay the strands as far as necessary, and procure a new strand of sufficient length and relay it, as shown in Figure 184 and described for the long splice in Figures 174 and 175. The ends are tied with an overhand knot and finished as described for the long splice. See Figures 178 to 181.

Once trying is usually an experiment; twice, and we begin to get the hang of it; three times and we win.

Time enough to call things a failure after they fail.

One of the worst habits we can acquire is waiting till to-morrow. To-morrow is a dream of the future and seldom comes. To-day is the field of opportunity, and every man should be ready to grapple the tasks before him.

It is not how much you do, but how well you do. It is not so much the kind of work you are doing, but the kind of thinking you are doing that will differentiate you and promote you.

You wind your watch and you turn the key in the clock, but you let your mind run down. You look the door to keep out bad men, but you leave your mind unlocked to let in the bad—men.

CAMPING

TENDERFEET IN CAMP*

By ALICE ARMIGER SKEEN

BLACK bugs in the water,
Red ants everywhere,
Chiggers round our waistline,
Sand fleas in our hair—
But the dust of cities
At any cost we shun,
And cry, amid our itchings,
"Isn't camping fun?"

Sand in fried potatoes,
Apples hard and green,
Thickest, strongest cocoa
'Most was ever seen—
But we eat with relish
"Hot dogs" overdone,
And say, between the fly-bites,
"Isn't camping fun?"

Water on the tent floor,
Mildew everywhere,
Wind that howls most dolefully,
Cold and foggy air—
Huddled in a corner
Praying for the sun,
Writing home to mother,
"Isn't camping fun?"

*From *Boys' Life*, the Boy Scout magazine. By permission.

KINDS OF CAMPS AND CAMPERS

By FRANK H. CHELEY

"THERE are two kinds of campers," says Walter P. McGuire. "One is the parlor-car camper. He is the fellow who always depends upon the guide or someone else to do the work about camp. He never learns much about camping, for he never does his share of the camp work. If he isn't a 'mollycoddle,' he is a mighty good imitation of one. The funny thing about this fellow is, he actually thinks he is roughing it when he sits by a fire somebody else has lighted, and eats meals somebody else has cooked, and sleeps on a bed somebody else has prepared. The tragic thing is, he returns from camp without ever having tasted the real joy of camping.

"The other kind of a camper is the one who pitches in and does his part, even if he has a paid guide to assist him. He doesn't let anybody be his nursemaid. He isn't that kind of a fellow. He has backbone. He isn't happy unless he himself knows the knack of doing everything. He learns how to make fires under all sorts of conditions, how to cook, how to make shelters and beds—in short, how to camp. He observes and asks questions, and is never satisfied until he has mastered details by actual experience. Doing things for himself, he has the satisfaction of knowing that he can stand upon his own feet—a man. He plays the game even, and asks no handicap. And he goes home from camp filled with the joy of it."

Needless to say, this volume has been prepared with the latter only in mind. We are not interested in the "parlor-car camper" and his needs.

Of course, there are camps and more camps. "Fifty-seven

varieties" would not nearly exhaust the list, and so of course each variety can not be taken up here separately and discussed in detail. However, it matters little about the actual variety, if a boy knows the few fundamentals of camping. Those who have learned thoroughly how to dress; what to take with them and what to leave at home in the way of equipment; what foods are generally best for camping, and how to prepare and eat them to the best advantage; what sort of beds are most practical for the various sorts of camps—how to make and care for them; how to take care of themselves physically in order to have the greatest endurance and efficiency, as well as how to get along in a congenial fashion with all sorts of people, under all sorts of conditions—those who have learned these things need have no fear about going camping. Of course, a working knowledge of woodcraft, campcraft, and nature will materially increase the enjoyment and worthwhileness of the outing, no matter what the variety. The various volumes of NATURE AND OUTDOOR LIFE discuss quite adequately every one of these conditions, so that you may study each one in turn by way of preparation.

It is very important, however, that everybody, no matter where he lives, in city, town, or country; mountains, plains, or seashore; north, south, east, or west, should understand clearly that *he can* camp out, for somewhere in the "fifty-seven varieties" are from one to a half dozen sorts of camps best adapted to his location and circumstances.

You can camp "in a far country," or in your own backyard. You can camp in a vacant lot, or on a roof, if it is impossible for you to get to woods, rivers, lakes, or mountains. You can hike and carry your outfit; you can go by bicycle, wagon, pack train, automobile, motor boat, yacht, canoe, and probably before long by airship. If you wish, you can live in a pup tent, a tepee, a temporary shelter, or log cabin. You can go alone, with a pal, with your gang, with your father, or perhaps with the whole family; or you may go to any one of

the ever-increasing number of camps conducted by the Scouts, the Christian or Jewish Associations, churches, schools, or private individuals. (If you do go to such a camp, be certain you are going camping, and not to a summer hotel. There is a great difference.) You may camp for a week-end, a month, or a whole season. You may go in the spring, summer, fall, or winter; but *you can go*, and you owe it to yourself to do it.

There are wonderful opportunities for camping in the cactus-covered deserts of Arizona and the Great Southwest. "The fir-clad slopes of the Rockies" offer opportunity for most of the "fifty-seven varieties," as do the "spruce hills of Maine." "The piny dunes of the Atlantic coast," the lake regions of the Central West, the "Laurentian wilderness of Canada," the semi-tropical, verdure-covered mountains of the South, and even the "snowy wastes of the far north," all have their attractions and possibilities for the camper. All outdoors is inviting. What one section lacks in fishing, or mountain climbing, or boating and swimming, is made up for in a dozen other ways. Just as you could not possibly get all the good things to eat in the world on one bill-of-fare, so it is impossible to get all the "most desirable" conditions for camping out in any one season, in any one location, in any one of the "fifty-seven kinds." Nature meant it to be that way, for she wanted to encourage you to go again and again under as many different circumstances as possible.

I have been trying to determine which of my numerous camps I liked best. Sometimes I think it was the ones among the beautiful lakes of Michigan, where we fished and swam or boated under a mystic harvest moon to the accompaniment of a never-ceasing chorus of bullfrogs hidden away in the cat-tails and pond lilies—but there were no mountains there. No, the best ones by far were those spent tucked in some mountain meadow by a purling stream, with snow-caps all about—but there was no swimming or boating there. So it

goes, each spot and season has its charm; and after all, it is being free in the open country, in the "company of congenial souls," that makes camping-out what it is. I'd rather camp three days in the river bottom back of the house with Dad as a pal, with nothing but our simple "tin-can kitchen-kit," our home-made tent and equipment, with a "grub list" made up from "Mother's pantry and fruit closet," than to spend all summer in the Alps with a ton of equipment and a party of unfriendly make-believes.

Warren H. Miller has given us, after all, the real information that we need on "Kinds of Camps." The following considerations are taken by permission from his splendid book on "Campcraft," published by Charles Scribner's Sons. He says in part:

"The same equipment that would be the acme of perfection in Eastern woods will of course require adaptation to camping conditions in the Rockies; the latter equipment would need extensive modification in Arizona, while none of them would be just the thing for a coastal cruise along the great bays and sounds of the Atlantic seaboard. Why? Because the natural conditions obtaining are different. The climate is different; fuel, water, transportation, and food problems are all different, and these factors cause modification of the equipment to suit."

It is these things that make camping out in different countries so fascinating, and it is these conditions, also, that explain the amazing diversity of tents, packing and sleeping paraphernalia, and outer's tools offered by the various outfitting firms. There is no one best tent, nor pack sack, nor canoe, nor blanket, nor ax, nor even hunting knife!

It all depends upon where you are going and what you propose to do. But for each country and climate there is one kind of camp universally conceded by veterans to be the best within certain limited modifications. Every detail of such a camp, every article of food, shelter, warmth, and transporta-

tion, exactly fits the natural conditions obtaining; and if any part of your outfit is unsuitable or is omitted entirely, by that much does your camp fail to meet the existing requirements.

Let us, therefore, throw upon the screen some typical American wilderness scenery, and discuss the various types of camps that fit best into their environment.

Scene One: Most familiar of all, the hardwood and hemlock forests that clothe our Appalachian hills and extend westward to the prairies and north to the Lake States. A country of noble stands of oak and maple timber, with great areas of thick brushland saplings; of placid and lily-padded lakes, where the fighting bass and "musky" lurk, and wild ducks congregate in the fall; of brawling brooks and alder bottoms, where trout and white-tailed deer tempt the adventurous spirit in the frosty seasons. The spring and fall temperatures are comparatively mild, snowfall light, if any, and nearly every part of this country is accessible to team and buckboard by old, abandoned lumber-road routes.

These are the conditions; what of the camp? *It is the beginner's country*, the ideal for the camper who cannot cook except in the most rudimentary fashion; who teams in a ton of things and forgets the salt; who totes twenty pounds of canned goods in a 10-pound wooden soap-box, and brings in a 50-pound tent and forty pounds of camp-cots and furniture to sleep two campers.

For him the heavy 10-ounce duck 9 by 15 foot wall tent, with a fly over it and a board floor; a folding canvas camp cot with two or three pairs of army blankets, some camp stools, a cook stove, a folding dining table, a collapsible cupboard; all the rods and sporting equipment he wants; fresh bread and ham, canned vegetables and preserves; a folding canvas bathtub—you needn't laugh! These things are all comforts; and as the team brought them into the camp site, and can take them out again, it is the logical style of camp for a country with such easy transportation facilities.

This country is also the ideal for the go-light camper, with his gossamer outfit, care-free and happy, with his whole hotel on his back, weighing less than thirty pounds. He is free to ramble and fish where he wills, to go where no blazed trail leads; he is never "lost," for his home is right with him, and he knows well that his few days' provisions are ample to see him safely to some settlement where further supplies can be purchased. There are any number of go-light tents and equipments, designed by those who have given the subject much study, and they afford quite as much real comfort as the caravan camp of the veriest tyro; but it takes an experienced camper to manage them properly and get the maximum of comfort and independence out of them. The basis for such equipments is a light one or two man tent of fine waterproof fabric, weighing not over 4 pounds; a light all-wool blanket or sleeping bag; the lightest of cook kits, and a variety of wholesome and nutritious provisions which are light and compact and form the basis of many times their weight of cooked food upon the addition of water from the nearest brook, with proper cooking. A light belt ax of the finest steel furnishes the go-light man with all the fuel, tent poles, and stakes he requires, and his mattress is either cut balsam and hemlock browse, or dry leaves and pine-needles.

Scene Two presents the spruce and the white-birch country of Maine, New Brunswick, Quebec, Nova Scotia, Ontario—anywhere in the growing range of these two trees. They do not thrive in the warmer climate of the hardwood forests; theirs is the country of long, cold winters, with the snow many feet deep from November to April; where the principal hardwood is the yellow and white birch, and the balsams, spruce, pines, and hemlocks cover the granite mountains—the land of the moose and caribou, of rivers that are but overgrown brawling brooks, with white water all the way down; of trout that are leviathan in size and omnivorous in their tastes as to fraudulent flies; a country where roads are few and far between,

Photo by Edwin Levick, New York

TAKE TIME TO PACK EQUIPMENT WISELY

A COZY CABIN BUILT BY BOYS AT CAMP CHIEF OURAY

where the blazed trail through the timber is the sole guide, and even a footpath is a boon. The temperatures are severe; the cold begins early in September, and the first light snows are on the ground before October. The summer is short and sweet, with the nights cold enough to demand efficient blanketing, and at certain seasons the insect life is such as to demand special preparation to withstand it.

To meet these conditions, to begin with, all transportation must be by canoe and shoulder pack, usually both, for every canoe trail has its portage. Wherefore we find two kinds of camps—the permanent log shack, into which the necessities of life have been laboriously packed in advance, and the nomadic camp, much like the go-light equipment of the more temperate zones, but designed to provide comfort under much sterner conditions. To save total weight carried by the party in such an equipment, the tent must accommodate at least four campers, yet not weigh over ten pounds. To meet the extreme cold of the spring and fall nights, ordinary army blankets will not do, as they make too bulky a parcel if enough of them are taken to insure warmth; wherefore the various styles of sleeping-bags, which are essentially a series of the lightest and finest all-wool blankets, with every superfluous inch of material pared away and the whole inclosed in a wind-and-water-proof envelope to prevent air currents drifting through the weave of the blanketing and stealing away the precious bodily heat. To meet the conditions of food supply with no available points of replenishment, enough must be carried to subsist the whole party, and this must be selected of the lightest and most nutritious of raw materials, with a good cook in the party to render them into palatable, wholesome, sustaining food. A practical knowledge of woodcraft will be essential—not book knowledge, which is likely to have some essential detail hazy or forgotten, but the knowledge that comes of experience, of having done it before, again and again, so that there will be no failure this time; knowledge of how to make the forest

itself yield the major part of the comforts, for, rest assured, the necessities will weigh enough to tax the whole party's combined strength without adding anything in the way of luxuries. It is the country for the veteran woodsman, for the camper who has already tried himself out and accumulated his experience in the easier schools of the temperate-climate forests.

Turning from this stern picture, let us throw on a milder scene, *Scene Three*, the great salt-water bays of the Atlantic seaboard, where shore-birds and wild fowl are countless, and toothsome and gamy salt-water fish are ready for your rod and line. A country of great stretches of open water, of vast green marshes, backed by deep, piney forests, of blazing white sand dunes and roaring lines of foaming surf. The days are cool and the nights comparatively warm, that is, a single blanket suffices, and most sleeping-bags are too hot. Transportation will be by boat or decked sailing canoe. The ordinary open canoe, so essential in the wilderness streams and lakes, is out of place here, as both wind and wave are too severe for it to live, and one's progress is continually interrupted by being wind-bound. It is almost impossible to paddle against such a wind and sea as gets up daily on these great bays and sounds, and the water is too deep for poling, wherefore the open rowboat, the sailing sneak-box, or the decked sailing canoe which will live and thrive in a sea that calls for three reefs in a larger craft.

Ashore the two big natural conditions are sand and mosquitoes. Sand will drift, blow, and get into everything, and at night the mosquitoes are abroad in untold millions. Forearmed against these two evils, there is no better country to put in an outing, for the wild life is abundant, there are a thousand diverse occupations for an outdoorsman, and the climate is pleasant and agreeable. To get rid of the sand nuisance, the tent should be of the closed type, with ground-cloth sewed fast to the bottom of the walls, and a high canvas sill provided

at the opening, or door. Sand drops from your shoes whenever you raise a foot, but will run off in the act of stepping over such a sill, so that when you set foot in the tent you have neither kicked a spurt of sand before you into the tent nor drained a shower of it off your foot into it on entering. At that, quite a little will collect, and one's sleeping-rig should be raised a few inches from the floor either by a cot or a mat of dried sea-grass, which latter can be had in great bundles along the bay shore.

The mosquitoes give little trouble during the daytime, but by sunset they are up and about, remaining all night and departing shortly after sunrise. These conditions make essential a fine mosquito bar, absolutely closing the tent, and a camp regime that will be through with supper before the mosquitoes arrive. Also a tent big enough to enjoy oneself in when the whole party is gathered inside, either because of inclement weather or the mosquitoes. With such single precautions, camping in this country is an enjoyable experience. Very little meat need be taken, as the supply of clams, crabs, and fish of all sorts seems inexhaustible. The cook fire must be surrounded on three sides by a wind-break, made of surf driftwood, to keep out blowing sand, and every cooking utensil in service must have a cover on it for the same reason. Avoid a tent that requires many poles to put up, for these are not easy to find along the beach; if camping up the estuaries and small sandy bays, with pines and hardwoods coming right down to the water's edge, this difficulty disappears.

For a lone cruiser, or two canoes sailing in consort, perhaps the best tent is a canoe-tent, buttoned over the cock-pit coaming, with the ridge rope strung between the two masts. The canoe is hauled out on the beach, and sand banked up around it; a mattress-bag is filled with dry sedge or sea-grass and put in the bottom of the cock-pit, and such a home is dry, warm, mosquito-proof, and quickly set up at the end of the day's cruise.

The last of the Eastern pictures now comes on the screen. *Scene Four*, a wild river, flowing, oh, anywhere—in the Laurentians of Quebec, through the green hills of the Alleghenies, or down in the cypress bayous of the Carolinas—it does not matter, so that it be a river with never a dam along its banks; and we are going 200 or 300 miles down it without expecting to see more than a bridge or two to remind us that civilization exists. In a word, a river to set the canoe voyageur's pulse beating faster and recall to him memories of that stout ashen paddle that in his hands drove the light birch-bark down hurtling rapids, past hungry bowlders, around down-trees, over dams and chutes—all the thrills and excitements that make canoe travel a blessed memory.

What are the natural conditions to be met? First of all, while the equipment does not have to be pared down to the fineness of a back pack trip, it must be reasonably light and compact, say fifty pounds per camper. There will be portages and down-trees to get over, and unless you want to double trip it, the duffel must be limited, as the canoe itself is no mean burden. This craft should not exceed sixty pounds in weight for the 16-foot size, and lighter preferred, provided that the river travel does not demand a stout, strong canoe to withstand man-handling over rocks. For absolute wilderness travel a heavy, all-wood canoe is needed, of the 18-foot size, and for any and all of them efficient repair kit and the materials to do with are essential. In the nature of things, the tent should be light and easily and quickly put up, without too many poles, which may take a lot of time to find at the stopping place. The daily regime calls for breaking camp and getting under way by eight o'clock, an all-day paddle with a brief stop at noon for a lunch and a rest, and definite stop about four o'clock to pitch camp, cook supper, and make all snug for the night. All the best canoeing is to be had when the nights are cold, for then the insect life, which is always abundant near water, has not yet begun to hatch out, or else

is frozen up for the winter. Wherefore the sleeping-rig must be comfortable and sufficient, some form of sleeping bag preferred to blankets, and the same inclosed in a waterproof envelope or tump-bag, for the canoe is sure to ship more or less water during the day, and unprotected bedding will be found soaking wet when you want to use it. The foodstuffs will be light and nutritious, and are best carried in waterproof side-opening food-bags that will protect them against water in the bottom of the canoe, float them safely in case of upset, and yet deliver them handy to the cook when wanted, for the meals must be swiftly and efficiently cooked, often after dark, when things get lost easily if dumped out of an ordinary tump-bag near the cook-fire. One three-quarter ax should find a place somewhere in the canoe, as it will often be in service in clearing log jams and opening impassable holes in the bayous.

Of all wilderness travel the canoe camping trip is probably the easiest on the bodily muscles, for one sits down the major part of the day, and the exercise of paddling is never severe enough to get that dog-tired weariness that comes from a hard day afoot or on horseback. Also for beauty and diversity of scenery, for continuous excitement with the natural hazards of the river, it is hard to beat.

As there is little time at night to gather browse or cut it, some form of stick bed or stretcher bed is preferable, though, with a good acetylene camp-lamp, there is no reason why all the dead leaves, pine-needles, or evergreen browse wanted should not be obtained after supper before retiring. It is something of a nuisance to do this daily, however, and one way out of it is to fill your mattress bag once for all, and carry it full in the canoe as you go along. There is always room, and unless there are long portages, the added weight is not perceptible.

Our stereopticon now swings 3,000 miles to the west, and there develops upon the canvas *Scene Five*, in the heart of

the Rockies, The forests are fir, balsam, lodge-pole, pine, and spruce, with cottonwood as the principal hard wood, and the trails lead through them all and out along great rocky slopes, with dizzy precipices awaiting him who loses the way. Then, up over snowy summits and divides, with perhaps a descent to brown bunch-grass prairie extending for miles. It is always windy and blowy, and the nights are cold and sharp. The distances are immense, and there is but little navigable water to help out.

These are the natural facts and conditions to be met. How is a camper to provide himself with food, shelter, warmth, and transportation in such a country? To begin with, we want a tent, a whole lot of a tent, not a shelter or an open lean-to, but the nearest thing to a canvas house for the whole party that can be provided. Now a camper can go afoot with a go-light equipment in that country, but he won't go far. There's a limit to what he can carry on his back, and the combined adversities of altitude and steep mountain trails set that limit at twenty to thirty pounds. Add to that the necessity for a warm sleeping rig, and you see why the foot traveler is limited to short trips of a few days' distance from the home camp. And as this latter must be located anywhere from fifty to one hundred miles in from the nearest railroad, we begin to seek out a pack-horse to carry the necessary outfit. Such an animal will carry 120 to 150 pounds on his back all day long, and subsist off the mountain meadow and prairie grass feed, with a little oats taken along for emergencies.

Now, here are the daily conditions: You are out tramping all day long, often in the deep snow. You come home at night dog-tired. You then want a warm, closed tent, out of the bitter wind, where you can change your wet clothes, hang them up to dry for next day, and get supper. The tent should be not less than 9 by 15 foot size, and of stout, waterproof duck, for any lighter fabric is doomed when the pack animal carrying the tent runs amuck in the tall timber and succeeds

in ripping a hole in it by trying to squeeze between two spruces that will hardly pass one horse, let alone his pack! However, he manages it somehow, in spite of the frantic objurgations of all the men in the party, and comes through triumphant, with your silk tent torn to ribbons in spite of the protecting "tarps."

The tent stove wants a bake-oven in it, and at least two pot-holes. Then we must have a rope for making temporary corrals, bells, and hobbles; a shoeing outfit; rope to hang wet clothes on along under the tent ridge pole; and in general, there is little gained in trying to save every ounce of weight possible.

On the other hand, all unnecessary luxuries must be left behind for the essentials themselves weigh enough as it is without mutiplying pack-horses. A party of four, each leading a pack-horse, can get along very comfortably, taking all the equipment and provisions needed for a two or three weeks' trip into the mountains.

One's personal outfit should be very complete, not in luxuries but in essentials, such as a fine belt-ax, compass, medicine kit, and above all a good emergency ration in a tin container that can be used in a pinch as a cooking utensil.

Swinging our camera southward for a thousand miles, *Scene Six* appears upon the screen—a limitless arid region, teeming with animal and vegetable life, even though no water is apparent. The roughest sort of bald, rugged, volcanic rock forms the going underfoot, and the mountains all about are made of it. It is a country of great purple distances, of weird and thorny vegetation, of endless level plains, always with a horizon of bare, craggy mountains, or queer, flat-topped mesas. The days are scorching hot, and the nights of intense, frosty cold; sometimes visited by heavy thunder showers, occasionally by a rainy drizzle, but usually of a brazen blueness shimmering in the desert heat. An iron country, yet one fascinating to every outdoorsman who camps

in it, who leaves the desert road and camps up in the hills and arroyos. If any tent at all is taken, it will be a closed one, for your cave-like open tent is likely to attract all the reptilian life of your vicinity, which appreciates your warmth and your shelter, but does not understand your sudden, startled uprising in the morning, and therefore bites. More often the wind-proof, rain-proof, and snake-proof sleeping bag is the only habitation carried; and if it storms or drizzles, there is the "tarp" to pull over your faces as you sleep, all in a row, with your feet to the smouldering fire, while the coyotes howl at you from the neighboring hills. As water is from 30 to 50 miles apart, it is obviously not the country for the foot hiker, unless he leads a burro with camping paraphernalia, horse feed, and water packed on his back. The best way to live, move, and have your being in that country is riding a saddle-horse and leading a pack-horse, or a string of them tied tail to halter, depending upon how far you are going. Wood is reasonably plentiful, and sage for browse, so your pack-horse will carry your sleeping bag, your extra clothes (sure to be wanted soon after sundown), your provisions, water-bottles, and horse feed (oats and bran to supplement the scant desert fare); and if you have a tent at all, let it be a light one, either with a canvas sill or a closed front, and a ground-cloth sewn to the tent bottom, all round. Unless you are crossing a country where brooks traverse your trail, so that one cannot miss the water, it is essential to have a guide who knows the water-holes and "tanks."

Study, therefore, your section of the country until you thoroughly understand the conditions that must be met, and plan a camp that will give you the maximum returns for time, energy, and money spent. Locate a suitable place that is reasonably accessible for week-end and little temporary camps; if possible, one that you can get to often. In my boyhood days, my crowd camped a few miles from the city under the protection of a huge overhanging bowlder. By

walling up the one end, and by building a large common bed of pine browse in the corner, there was room comfortably for ten, each rolled in his own blanket. We built a generous stone fireplace in front, prevailed upon a tiny stream to change its course for our benefit, and we had a complete week-end camp that was always ready. It cost us nothing but a little observation and ingenuity. It was a practice camp for every one of us, and paid dividends.

Later on, as we grew older, we built a log cabin—one large room for kitchen and dining room, with a lean-to bunk-house attached. The huge fireplace, every rock for which we selected and rolled in, was a joy. My best memories of boyhood are invariably associated with that old open grate. Friendships were made there that have lasted through all the years. The old bunk-house had room for twenty in one long row, and when fully occupied it was necessary to have a "captain" who gave orders, at stated intervals, "to turn over." This was used winter and summer, and became a veritable school of camping and woodcraft for us all.

The United States Forestry Service will lease at a very moderate fee to any respectable party a small acreage on any of its vast domains for the erection of a family camp or cabin. What would be more fun than to enlist your father and your mother, your brothers and your sisters (if you are fortunate enough to have them) in helping you build such a camp of your own? It can be done at little cost, and provides camping facilities for the whole family as they grow up together. In this book you will find instructions for building a log cabin and shelters of various sorts.

Such a family camp makes it unnecessary to "tote" equipment back and forth, and even a year's food may easily be transported to such a camp by wagon or pack-horse at one time, so that it is always ready to "receive guests," summer or winter. There are thousands of such cabin camps springing up all over the country, and it is a good sign. Why not plan one now for your use?

Let us suppose you are a boy (although girls too should read what we are about to say) and if a temporary or home camp cannot be arranged, and you are not yet ready to camp on "your own hook" but must attend an organized boys' camp conducted under some other auspices than your own, there are several important things that you should consider in making a selection, namely:

(1) Is the camp you are choosing run for *boys*, or for *money?* There are both kinds. Some camps that are run for boys, incidentally do pay good returns to their owners, but too often they are merely summer boarding places under canvas, where the activity resorted to is always determined upon by "how much it costs" and "if it will pay." Steer clear of that sort of a camp—unless you are a "parlor-car camper."

(2) Is the leader a high-class, trained and experienced man, who knows boys as well as camping? Many of them are; some are not.

(3) Is the camp well located as to sanitation, safety from flood and fire, and still in a real wilderness?

(4) What has been the history of that particular camp? Have boys come home year after year enthusiastic, boosters, improved physically, mentally, and morally, or not? That is the acid test. Apply it to your choice rigorously. If the best class of boys return year after year, that is pretty convincing evidence that it is a real camp.

(5) Is it a democratic camp—or only a place for millionaires' sons? There is absolutely no place at all in real camping for anything that even savors of snobbishness. A camp is a friendly democracy, or it is nothing. Be very careful on this point.

(6) Finally, does the camp really teach *you* to camp out, learn at first hand nature's secrets, and become self-reliant and resourceful by practice, or does someone else do all those things for you? If they do, it is no camp at all, but a day nursery.

It is a great privilege to be taught how to camp by high-grade men who know how. If you can't get that sort of experience, strike out for yourself with a congenial gang and a friendly man who is just a big boy, and become self-made campers. Learn by doing. That's where your advance preparation will come in very handy; and after all is said on the subject, probably this last-named variety is the best in the long run.

SCOUTING FOR A SUITABLE SITE

By FRANK H. CHELEY

HAVING decided to respond to the insistent call of the wild, and having gotten ready "so far as lieth in you," and having determined by the simple process of elimination the type and the approximate geographical location of your outing, the next logical thing to determine is the exact spot, if it is to be a permanent camp. If not, to carefully consider the important points of any good camp site, coming to understand them so well that you can apply them quickly and with wise judgment to any number of locations that may come under consideration, for, in the long run, much of the lasting benefits of your camps will depend on how well you have chosen the spot.

There are a good many things about camping that are mostly good, but, on the other hand, there are *some dangers* that should be carefully avoided. These have quite as much to do with where you camp as how you camp. Roughing it does not by any means demand that you ignore common sense. Primarily, you camp in order to enjoy "the pure air, the bracing and lung-healing power of the woods, the sun bath, its tonic exercise, the nerve rest, and the joy that comes from control of mind and body." Consequently you should avoid,

in choosing the camp site, anything that would tend to neutralize these benefits.

There are a few absolute fundamentals that should always be considered, and in addition a larger number of desirable conditions, as many as possible of which should be sought, for each one adds its bit in its own way to the joy and worthwhileness of the experience.

A Place to Pitch Your Tents

First among the absolute essentials is a desirable place to pitch your tents. High, dry ground is of paramount importance, with careful consideration given to natural drainage. Wet, or even damp beds, muggy clothing, and mildew in camp belong only to tenderfeet, and are responsible for all sorts of colds, sore throat, rheumatism and the like. Then, too, summer storms are often very sudden in their origin and severe in their nature. Select a spot, therefore, that can never "drown out," no matter if it should rain all summer. Do not depend merely on your trenching, but locate so that the nature of the soil and the "lay" of the land will care for any over-supply of water quickly and efficiently. It's no fun at all, even if you do love an adventure, to roll out at 2 A.M. in your bare feet, even in mid-summer, only to wade around in oceans of mud, trying to rescue your already drenched wardrobe. Invariably, a tackle box or two gets kicked over, or a good kodak is ruined—or something worse. "A little foresight is worth a deal of behind-sight" in forestalling such an experience.

This matter of high ground and drainage is especially important if you are anticipating a camp on or near water, whether by a running stream or a lake—it matters little about the size. I have seen an insignificant, friendly little brook, which ordinarily ran hardly enough water to bathe in, change in a few hours of the night to a dangerous torrent, wildly reaching out for everything in its path. And I have

seen a lovely camp placed too low on an inviting sand beach, apparently well sheltered from all harm, completely ruined in an hour, and lives endangered, as the result of a severe on-shore storm.

Such storms invariably come when least expected, and in consequence find the camp unprepared. Avoid gullies, or dry-stream beds. Keep out in the open as far as possible, and on high, solid ground. Aside from storm danger, high, well-drained ground should be sought, because such ground is always cooler, more healthful, and much freer from mosquitoes and other camp pests. In a malarial country, this is of special importance. Kephart says: "If one is obliged to camp in a malarial region, he should not leave the camp fire until the sun is up and the fog dispelled."

Whenever possible, it is desirable to have the camp face the east, with a storm-break of some sort, either timber, hills, or heavy brush, on the west and north.

The go-light camper should invariably begin two hours before sundown to locate a suitable high and dry location on which to spend the night. In fact, the good woodsman is always on the lookout for an ideal spot. Better lose an hour's time by stopping too soon, than to lose a night's rest by being caught in a storm in a bad location. Never camp all night on a stream you expect to cross in the morning. Cross while you can. Look for flood marks on the trees, and always camp above these indications.

If the camp is small, there will be no difficulty in locating a spot where the sun strikes it a good part of the day, and the prevailing breeze gets a fair chance at it. If the camp is to be a large one, probably the best location will be a high prairie or plateau, with plenty of open ground for games and the like. camp parties need plenty of room. If such a spot is chosen, it should be in close proximity to woods, or a considerable number of large trees. Avoid camping under old and decaying trees. They are very dangerous.

In case the tents are to be pitched in or near large trees, there are several matters that need special notice. Are the trees solid, safe, and deep-rooted in case of high wind? Keep a sharp eye out for dead limbs. In case of fire starting in the tents, could a general forest fire result, or in case of a general forest fire, would an escape be easy on short notice? I was in a camp one season where a boy narrowly escaped death from a huge falling limb, which crashed through his tent in the night, as a result of a heavy wind. I heard this past summer of a dozen boys who were compelled to break camp and pack-out in the wee hours of the morning because of an on-rushing forest fire. Both parties had chosen their camp sites without due regard to important matters.

Usually old camp sites are undesirable, for health and sanitary reasons. Choose new ones wherever possible, even if it does take a bit more elbow-grease to put them into livable shape.

A Supply of Fresh Water

Probably the second most important consideration is to locate reasonably near a sufficient supply of clear, cool drinking water. You can carry fuel some distance and enjoy the task, but when every bucket has to be toted in, the arrangement is bad, for two reasons. First, because you never have the water when you want it; and second, because if it's hard to get, you will be entirely too sparing of its use.

You cannot be too careful about your water supply. Don't take anything for granted. Investigate its source thoroughly every year before you use it. It may have become badly contaminated since last season. A spring at its source is, generally speaking, the safest. Even if you are fortunate enough to have such a spring, look it over very carefully and give it a thorough cleaning before use. A tiny bit of seepage, or surface water running in from above, may pollute even a mountain spring. There is on record evidence that

more than forty cases of typhoid fever, occurring in a certain camp, were traceable to a spring that *seemed* absolutely clean and safe. Investigation showed that seepage from an old mining claim more than a thousand feet up the mountain was responsible. The pollution worked its way down through the rock crevices and into the spring.

Wherever possible, have the water analyzed by a reputable doctor, or the nearest city chemist. To do this, follow these simple directions: Take two one-quart fruit jars, *boil* them (including tops and rubbers) vigorously twenty minutes, completely immersed in clean water; remove from water and screw tops (with sterilized rubbers) on immediately. Take them to the water in question; open and fill them quickly; screw the tops on securely, and ship or personally take them to the chemist.

Springs along stream-beds that may at times of high water become flooded are always dangerous, and should be most carefully cleaned before use, especially if the bottom is covered with mud, leaves, and litter.

If drinking water is taken from small streams or rivers, it by all means should be carefully analyzed before use, unless you are so far back in the wilderness that there is very little chance of human habitation above you, with its consequent pollution. Even then you run the chances of pollution from dead animals and the like. If possible, when using stream or river water, filter it through a bed of gravel into a home-made spring by the bank. While this is not absolute protection, it helps. If the camp is to use a large amount of river water and be permanent, some sort of filtration bed should be built.

Avoid wells, unless they are on farm property where they are in constant use. Abandoned, or even only occasionally used, wells are dangerous. If they happen to be tubular wells with a metal pump, there is less fear of pollution. If they are the old-fashioned open well, perhaps stoned up and covered over, they are nearly certain to be unsafe. I know of such a

well that was famous in the hill country of Missouri. Every teamster, hunter, and tie-cutter that came along stopped to have a drink from the old "Blue Spring Well." It had a flavor all its own. When a boys' camp was located near, the water was analyzed, and found absolutely unfit to drink. It was pumped dry and carefully scrubbed out, but to no avail. It was bad, and water for drinking purposes of the camp had to be brought several hundred yards from a spring in the hills.

Go-light campers and hikers, generally speaking, will do well to carry a canteen, filling it at pumps or satisfactory springs. "*When in doubt, find out,*" is good water wisdom.

Dr. Charles E. A. Winslow, the noted biologist, makes the following suggestions on water, which are worth remembering:

"The source of danger in water is always human or animal pollution. Occasionally we find water which is bad to drink on account of passage through the ground, or on account of passage through lead pipes, but the danger is never from ordinary decomposing vegetable matter. If you have to choose between a bright clear stream which may be polluted at some point above, and a pond full of dead leaves and peaty matter, but which you can inspect all around and find free from contamination, choose the pond. Even in the woods it is not easy to find surface waters that are surely protected, and streams particularly are dangerous sources of water supply. We have not got rid of the idea that running water purifies itself. It is standing water which purifies itself, if anything does, for in stagnation there is much more chance for the disease germs to die out. Better than either a pond or a stream, unless you can carry out a rather careful exploration of their surroundings, is ground water from a well or spring, though that again is not necessarily safe. If good water cannot be secured in any of these ways, it must in some way be purified. *Boiling will surely destroy all disease germs.*"

Major D. C. Handley, gives this bit of advice to those who camp out:

"You should never drink from open streams or springs unless it has been proved beyond a doubt that the water is pure. In case of doubt you can purify it this way in a few minutes: Take one teaspoonful of chloride of lime and dissolve it in three pints of water; this makes a stock solution. Take one teaspoonful of this stock solution and add it to every two gallons of water to be purified and allow it to stand ten minutes. It's sure death to all germs, and makes any water pure."

Wood to Burn

Fuel supply, also, is an important matter to consider in locating your camp. It is surprising how much wood it takes to supply a camp, even with reasonable economy. Of course, the go-light camper, the hiker, the packer and the like have very little difficulty with fuel, for their wants are simple. Squaw-wood, if there is no other kind, will keep them supplied, but before a permanent or even a long-term camp is finally located, the matter of quantity, quality, and accessibility of fuel should be looked into carefully. In this connection, it is well to know what sorts of wood, native to your section, are most satisfactory for cooking and night fire. Generally speaking, the various sorts of hard wood burn more slowly and give a more satisfactory bed of hot coals for cooking. For a quick, hot fire the soft woods will be better. (For a more detailed discussion of the properties of various kinds of wood, see "Kinds of Fire and Their Uses" on page 25.

The mere fact that there are quantities of trees near by with "loads" of down-wood does not signify that it is desirable camp fuel. You must have wood that burns well. Tops left by lumbering operations or by tie cutters will often provide a good supply, but are also bad fire-traps. Do not camp in the midst of a wide acreage of such slash.

Many family camps have found it an economy to purchase cordwood from a near-by farmer, rather than to cut the standing timber, if this is the only kind accessible. On Government

Forest Reserves it is absolutely against the law to cut living trees without permission. In such cases, the supervising rangers will usually grant permission to fell a sufficient number of insect-infested trees to supply your wants. Very often, slabs can be easily secured from a neighboring sawmill. They make excellent fuel, and are easy to handle. For river and ocean camps, driftwood will often be found in sufficient quantities.

A Convenient Food Supply

Accessibility to food is also a very vital matter. The go-light camper usually carries his commissary of dry, concentrated foods with him in such quantities as will carry him safely from one supply point to another. He usually counts on breaking the routine of his diet with fresh fish from the streams, or small game which he may snare, trap, or shoot. In the more permanent camps, however, there are several angles to the matter of food supply. Either a large enough quantity of it for the entire outing must be taken into the camp at the beginning, or frequent trips made to the nearest railroad station or country store for additional supplies. Some camps rely on securing certain fresh stuff from a not-too-far-distant farmer. Many times this is an excellent plan. In any event, the camp should have reasonable accessibility on account of food or possible sickness.

In the usual camps there will be little or no game, and consequently, if there is to be any fresh meat, some arrangements must be made for its supply and proper care. Frequently this involves either putting up or securing ice. Meeting this condition very often has a great deal to do with the final choice of at least a permanent camp site, and should be carefully thought out *before* you establish yourself, rather than *afterward*. Salt ham and bacon, along with a variety of canned meat, does well for a time for seasoned campers, but it is poor summer diet for long stretches.

Food for Your Animals

The proverbial goat would be a good beast to train for camp packing and draying, as there are usually enough tin cans to keep him "well fed." Unfortunately for both parties, goats won't do, and we must resort to horses and pack-mules. Some camps are able to have their stuff hauled in and called for at the end of the season. This is probably the most satisfactory for long-term camps. For short-term camps, pack trips, or gipsy trips, it is probably better to hire the animals for the period you are out.

This means that grazing possibilities must also be considered. Generally speaking, if a site is chosen with this in mind, the beasts will fare well with comparatively little grain or hay. However, don't make a mistake of a camp I heard of last season in which they were compelled to feed the horses with potatoes, and bran-mash made of graham-flour from the commissary, because "there wasn't any grass where we camped."

Beds and Building Material

Unless you plan to bring beds of some description into camp, it will be very necessary for you to locate where there is an abundance of wild wood material with which to make beds. If you are going to build browse beds, there should be large numbers of reasonably young trees handy. *Only the lower limbs of these should be cut*, and always with a sharp ax, and with the greatest care. No camper is justified in "slaying" a young forest, merely to find a comfortable place to sleep. If stretcher beds are to be built, then you will need an ample supply of poles. If grass or brush are to be resorted to, then plan accordingly. Proper bedding material is of the greatest importance, especially if you are to camp some time.

Perhaps you will choose to live in woodsy shelters of some sort, instead of tents. If so, there must be proper material from which to build them. Perhaps you even contemplate

erecting a cabin or a shanty. Then you must have logs, some few boards that you should not have to bring too far, and a quantity of suitable poles for building furnishings of one kind or another. Be sure to consider all these things in making your final choice.

Special Considerations

Some other desirable considerations in the choosing of a camp site that will materially add to the real joy of your outing are:

Reasonable isolation. As has been said before, you *can* camp anywhere with complete success, but if you can get far enough away from home to enable you to drop dull care, so much the better. New sights and sounds and smells are interesting and desirable. Get away from public roads. Steer clear, as far as is possible, of summer resorts. Get where every passing automobile cannot stop to share a meal, or sit too long by your inviting camp fire. *Get away from folks.* That's the half of camping. If you want to go to a picnic, go by all means, but do not call it camping.

Locate in interesting country, where there will be ample opportunity to see things worth seeing. No doubt you will be planning several all-night trips from camp, and you should be reasonably sure there is somewhere to go. It may be to famous fishing grounds for a few days' sport with the "big ones." It may be to some mountain peak, from the summit of which you can see how the world is made; or it may be to a wonderful underground cavern that sheltered some historic figure in times gone by; or to an interesting Indian village or burial ground. It may be to a sawmill, a mine, a stone quarry, a lake, a lighthouse, or some other novel place. If possible, select a camp site that can be headquarters for wide wanderings, so that you can become in a very real sense an explorer, a frontiersman, a pioneer, and thus get the very best from your outing.

If you can locate where there is a safe and attractive place for swimming and boating, so much the better, but be very sure of the safety element. If not, you should seek something to take their place, such as hiking and mountain climbing, and above all, abundant opportunity to study nature in your own way. Go where the wild flowers riot in the meadows, bogs, and on hillsides; go where the wild birds live, and sing, and rear their young. Go where there are patches, at least, of "forest primeval," with the "murmuring pines and the hemlock." Go where shy wood-folk peep out of alder thickets, or around rotting stumps, or from carefully concealed tree homes; for unless your camping-out tremendously enlarges your wild-wood acquaintance, it has not been a real success—was not in the proper place.

Scout, then, until you find the right location, bearing in mind the importance of a suitable place for your tents; plenty of pure, cold water; an adequate wood supply; not too inaccessible to market; pasture for your animals; an abundance of wild-wood material with which to make yourself comfortable, and wide, open, beautiful country that will entice you far into its mysterious depths, where you may lose yourself from civilization for a period.

If you can remember these things, you will find camping-out the biggest thing in your life, and you will return home each time with a body strong and more healthy, with a mind enriched, with an imagination immeasurably stimulated, and life enlarged. What more can you rightfully expect from any experience?

Such camping experiences give us worth-while things to talk about, tend to act as a good guide to our reading, and set most modern "good-times" in such unfavorable contrast that the latter lose much of their appeal. To become a good camper is a challenge to the best in us, as well as an achievement.

OUTFITS AND EQUIPMENT

By FRANK H. CHELEY

IF THERE are "fifty-seven varieties" of camps, what shall we say about the number and variety of different sorts of camp outfits and equipment? All one needs to do to become duly impressed with what one *might* take camping with him, if he had unlimited funds and transportation facilities, is to go, page by page, through any well-known camp-outfitter's catalogue. For instance, there is an endless variety of tents, in size, in color, and in design. You can sleep in any sort of a bed under the sun, from a common browse bed to a silk pneumatic sleeping-bag. There is an ax for every type of camp, and a knife for every purpose you can imagine, from skinning game to pealing potatoes; and when it comes to clothing, words fail utterly, for the lists of sweaters, and flannel shirts, and waterproof trousers, and oil-packs seem endless.

Fortunately, the average boy will not find it convenient to equip himself from any such a supply depot, so perhaps our task is not so great, after all. Probably he will find it necessary to make such of his own simple equipment as is possible, and to complete his list by borrowing from his father's tool shed and his mother's kitchen cabinet, purchasing only a few special treasures, and because of the very difficulties involved in securing these, will be prompted to take better care of them than if he had come into their possession by some easier method.

Elaborate camp equipments are all right to look at and dream about—and even use by parlor-car campers—but for the average young person they are out of the question, and

he must learn from the beginning how to keep his outfit down to the minimum of bulk, and weight, and expense, and even how to get along very satisfactorily with only a small part of what he *thinks* he needs, if it becomes necessary.

Even a party of a dozen boys can camp out with complete satisfaction with very simple equipment. It is the purpose of this book to discuss such an equipment, leaving out quite completely "millionaire kits"; for the boy, or man either, who *can* camp that way, will not have to be bothered even with thinking of outfits and equipments: someone paid for the purpose will look after that for him, along with many of the other primary joys involved.

Let us, then, for common sense's sake, divide outfits and equipment into their several logical parts, and begin to assemble our general and personal effects—at least on paper.

Let us discuss each group briefly, in order that we may check off the articles as we go, and so leave no necessaries behind. Let us consider the various things that should go into a general camp equipment, for say a party of six, for a ten days' outing, leaving you to adjust such a list to the actual number in your party and the period of your stay.

First, of course, will come your tents. There is a large variety, each of which is suited for special needs and conditions. You should be familiar with all the standard shapes, their advantages and disadvantages, and then select the one you think best suited for your particular purpose. But if at all possible, be sure to camp in a tent. Cabins, shacks, and shanties have their attractions and place, no doubt, and should not be belittled, but for a real camping out in the summertime, use a tent. "Day and night there is a constant seepage of fresh ozone of the forest through the texture of the tent wall, neither draft nor stagnation, but a constant change of air. Thirty nights in a tent are worth a year in any cabin," declares Warren H. Miller in "Campcraft," and we believe he is entirely right.

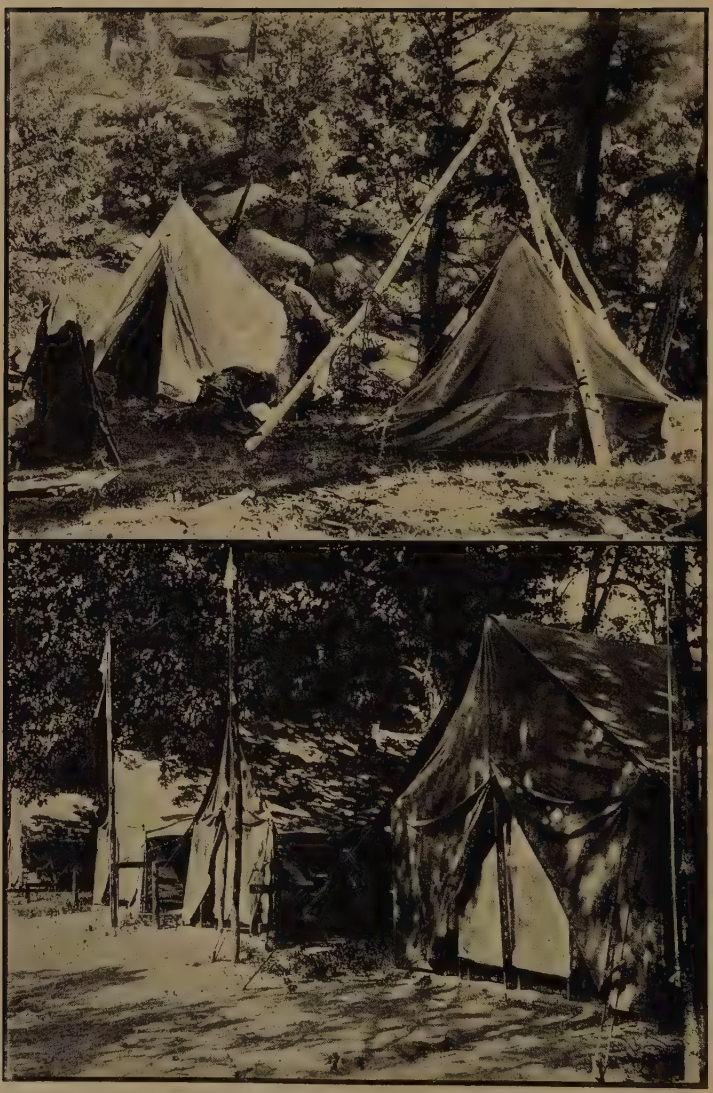
Figure 1 shows the ordinary wall tent, which uses commonly a ridge pole and two upright poles. It can be made in any dimension, and used with a fly it is probably the simplest pitched and most satisfactory all-round tent for all locations and climatic conditions. A 6 by 8 wall tent with a 2 to 3 foot wall will accommodate a father and son nicely, leaving ample room for baggage and other equipment. An 8 by 10 will care for four campers nicely. A 10 by 12 will care for six sleeping on

FIGURE 1

the ground or in single cots, while a 12 by 14 wall tent will sleep eight campers very nicely, especially if double-deck canvas bunks are used.

Ten to twelve ounce canvas will be found the best economy, with a ten-ounce fly, unless standard government khaki can be secured. This is somewhat lighter in weight, but is of the very finest grade of cotton goods, and will wear like iron, if taken care of. In addition, it has the advantage of being cooler, more restful to the eye and less conspicuous than a white tent. Tests have proven that insects, especially mosqui-

BUILDING TABLES AT CAMP CHIEF OURAY, DENVER



Upper—A LIGHT PYRAMID TENT PITCHED IN THE WOODS
Lower—WITH BUNKS SECURELY SCREENED

toes, dislike the interior of khaki tents. Its very color saves it from showing the ordinary wear and soiled spots that are inevitable. (Canvas or duck used in tents is designated according to the number of ounces by weight to the yard.)

It is very desirable, if you are going to make your own tent, to provide it with a deep sod cloth, which is simply a well-hemmed strip sewed about the bottom of the wall, so that it will lie flat on the ground inside the tent when it is pitched. A floor cloth to cover the entire bottom is also a nice addition to any tent, especially for that portion that is to be used as a bed. It tends to keep out moisture or dust, as the case may be.

In shipping tents, each one should be rolled tightly and slipped into a stout canvas bag with a shirr string. A grain sack will serve for all small sizes. In this way the bag takes the wear and tear and gets the dirt.

If you care to, you may render your goods mildew, water and fire proof before you make it into a tent (or treat the completed tent afterward, just as you please), by soaking it over night in a solution made of two bucketsful of tepid rain water, in which carefully dissolve three pounds of sugar of lead and three pounds of alum. In the morning, remove the tent and hang it up to drip and thoroughly dry. Never try to waterproof a tent by applying any oily compound, for it invariably rots the fibers and makes a sticky, nasty odor in extreme hot weather.

Pegs for each tent should be shipped in a stout bag. The angle iron peg is by far the most satisfactory, and costs little more than the wooden one. If you can't buy them, have a blacksmith make them for you. Fifteen inches is a good length, with the notches filed smooth, so as not to cut the guy ropes. Such stakes are wicked things to fall over, especially in bare feet or in the night. Wherever they are out in the open, a stout stake should be driven by them as a warning and protection. If they are driven flush with the ground as is often done,

there is danger of rotting your guy ropes in a few seasons, and this is expensive.

There is a right and a wrong way to pitch a wall tent, as well as an easy and a hard way. Learn to do it right the first time, and forever afterward it will be an easy, simple task. Horace Kephart in his "Book of Woodcraft and Camping" describes the operation, which is best done by four individuals, as follows:

"Nos. 1 and 2 procure canvas, and Nos. 3 and 4 the poles.

"Nos. 3 and 4 lay the ridge pole on the ground, in the direction that the tent is to stand; then lay the uprights at each end of ridge pole and at right angles to it, on the side opposite that from which the wind blows. Then drop the tent pins and hammers at their respective ends of the tent; then drive a pin at each end of the ridge to mark front and rear. Meanwhile Nos. 1 and 2 unroll the tent and spread it out over the ridge pole and on both sides of it.

"Nos. 1 and 3 now go to the rear, and Nos. 2 and 4 to the front, and slip the pins of the uprights through the ridge pole and tent. If a fly is used, it is placed in position over the tent, and the loops of the long guys over the front and rear pole pins. No. 4 secures center (door) loops over center pin in front, and No. 1 in rear. Each goes to his corner, No. 1 right rear, No. 2 right front, No. 3 left rear, No. 4 left front.

"All draw bottom of tent taut and square, the front and rear at right angles to the ridge, and fasten it with pins through the corner loops, then stepping outward two paces from the corner, and a pace to the front (Nos. 2 and 4) or rear (Nos. 1 and 3), each securely sets a long pin, over which is passed the extended corner guy rope. Care must be taken that the tent is properly squared and pinned to the ground at the door and four corners before raising it.

"Nos. 1 and 3 now go to the rear, and Nos. 2 and 4 to the front pole, and raise the tent to a convenient height from the ground, when Nos. 2 and 3 enter and seize their respective

poles, and all together raise the tent until the upright poles are vertical. While Nos. 2 and 3 support the poles, Nos. 1 and 4 tighten the corner guys, beginning on the windward side. The tent being thus temporarily secured, all set the guy pins and fasten the guy ropes, Nos. 1 and 2 to the right, Nos. 3 and 4 left, and then set the wall pins."

There are a number of things that every camper should know about the care of a pitched tent.

If the ground is soft, place a flat stone or bit of wood under each upright pole, to keep it from settling into the dirt and letting the tent sag.

Immediately after a tent is pitched, ditch it by digging a six-inch trench completely around it, with suitable outlets to

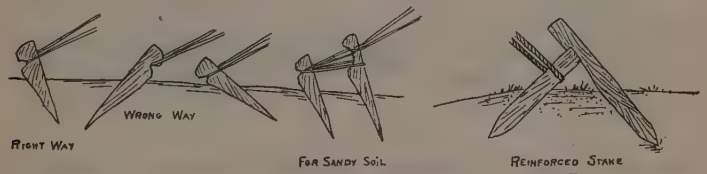


FIGURE 2

your trench at the low places, to allow water to drain away quickly.

Rain invariably tightens a tent to a marked degree, especially if it is equipped with long guy ropes. Unless it is closely watched and loosened before a storm, very often the shrink of the rope will pull the eyes completely out of the tent, unless by chance some weak seam goes first. Keep your ropes just taut and examine them frequently.

Unless your tent has been very heavily waterproofed, it will drip at every point that is touched while it is wet. These ceaseless drips are very annoying, and should be avoided as far as possible.

The method used in driving the pegs is of utmost importance. There is a right way and a wrong way. Study Figure 2 carefully. Sometimes pegs will not hold a tent at all because of

the nature of the soil. In that event, various methods may be resorted to. Perhaps the simplest of which is that shown in Figure 3.

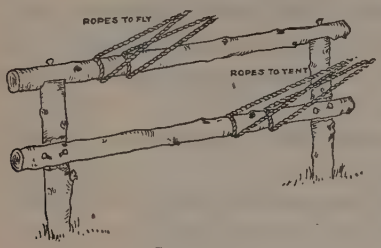


FIGURE 3

If this is not convenient, and it isn't always, try anchoring all the ropes by placing on top of them just back of the stakes and full length of the tent a green log as shown in Figure 4. This may even be further improved

FIGURE 4

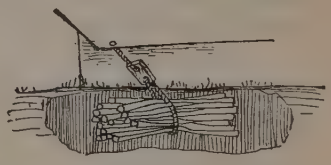


FIGURE 5

by anchoring the corner guy to a stout bundle of brush, or a stone as shown in Figure 5.

If you are going to make your tent or have it made, be sure to doubly reinforce the corners and double the canvas where the upright poles go through and have it equipped with metal slides on the guys. Also have a cotton cord two feet long sewed in each seam, just under the eaves, so that one hangs down inside and one outside. This simple device enables a part of the tent wall to be raised and quickly tied in order to "air out."

Whenever possible, equip your tent with a fly, for it not only helps to keep the tent water-tight, but keeps it cooler in the daytime and gives the tent more stability in the wind, because of the double set of guy ropes thus provided.

Also take with you a good supply of good grade cheesecloth for protection from mosquitoes and insects. Cheesecloth is much more satisfactory than either the plain mosquito net or

bobinet. Also supply yourself with a couple of dozen of medium sized safety-pins with which to fasten the cheesecloth to the tent, and you will be rid of all manner of buzzing, biting insects that usually infest a boy's camp.

After the tent is pitched true and straight with every peg in proper place and ditched, then turn your attention to the

FIGURE 6

inside and make it as convenient as possible. Have a place for everything and keep everything in its place. Stretch a stout rope from upright pole to pole to hang clothes on. A tent hall tree can easily be devised for each tent that will aid materially in keeping things in place. (See A, B, C, and D, Figure 6.)

Every tent should have a light of some sort. The pocket electric flash lamp is best and safest. A gasoline lantern is also handy, but it is so bright that it draws mosquitoes and other insects. A home-made lantern may be made of a tin can and a candle that will often serve the purpose, but if used, great care should be taken against fire. (See Figure 7.)

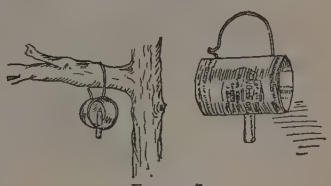


FIGURE 7

A bundle of elder leaves hung at each end of a tent will tend

to keep flies out, and cayenne pepper will drive ants away. If bothered with mosquitoes, make a smudge in a tin can and

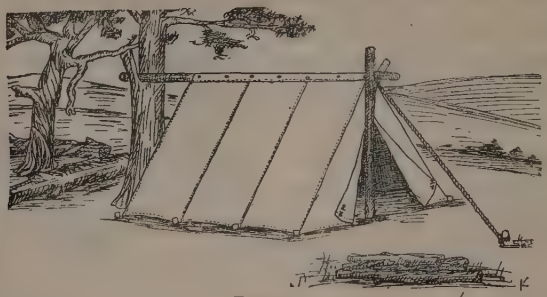


FIGURE 8

drive them out at twilight, then close the flaps. Cheesecloth is the only sure protection, however.

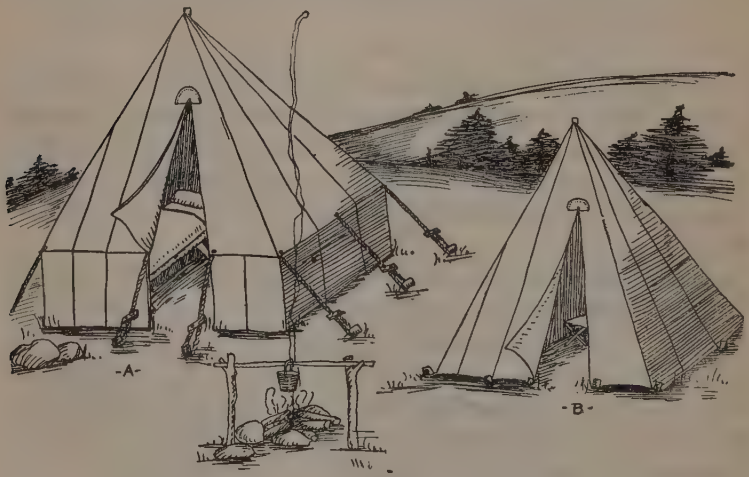


FIGURE 9

Figure 8 shows a wedge tent. This tent can be used much as a wall tent. It can be pitched upon poles cut in the wilderness, or with a stout rope sewed into the ridge. Where weight

and bulk are a consideration, it is a desirable shelter. Sometimes it is made in two halves, much as a shelter tent is, each half being carried by a camper and laced together into a tent at night.

Figure 9 shows a pyramid or miner's tent, both with and without walls. This is a one-pole tent, or can be conveniently put up by equipping it with a stout manila rope, sewed at the apex. This rope may be thrown over a convenient limb, or

FIGURE 10

fastened to a tripod of poles erected on the outside. It is a very satisfactory two-man tent (7 by 7) or a four-man tent (9 by 9). It is light, easily set up, and roomy. A clothes-hanger can conveniently be dropped from the apex inside, upon which wearing apparel can be hung at night.

Figure 10 shows the Amazon tent, which is a great favorite. The extra front makes a capital lounging place or mess tent for a small party, and will serve nicely, when properly adjusted, to throw heat from a small outside fire into the inside of the tent. It is easily pitched, is roomy, and is very generally used for camps that are moved every few days. It differs from the lean-to, light-pack tents, by being larger, with a complete front wall in the form of tightly fitting flaps.

It is a good idea to have the protruding fly made separate, and a row of brass grommets put in along both ends and the ridge of the tent, as well as one side and one end of the fly, in order that it may be conveniently laced into position as a

FIGURE 11

fly, or as a wind-break at either end, to better facilitate warming the interior from the night fire.

Figure 11 shows the common forms of the sportsmen's tents used especially for canoe trips, automobile trips, hiking trips, and pack trips. For these purposes, any of them are probably superior to the wall tent. They are easily pitched on poles that can be cut in any thicket, or even pitched with ropes tied to trees, and have the advantage of making possible an all-night fire, the canvas backs catching the heat rays and reflecting them upon the sleeping occupants. They should always be made with generous sod cloth, and as thoroughly fire-proofed as it is possible to make canvas. They are so simply made that every camper should own one and keep it in readiness

for short trips. Made from the lighter fabrics, the weight can be reduced to a very small figure.

Figure 12(A) shows the Sibley tent now used to a large extent by the army. The outstanding advantage undoubtedly

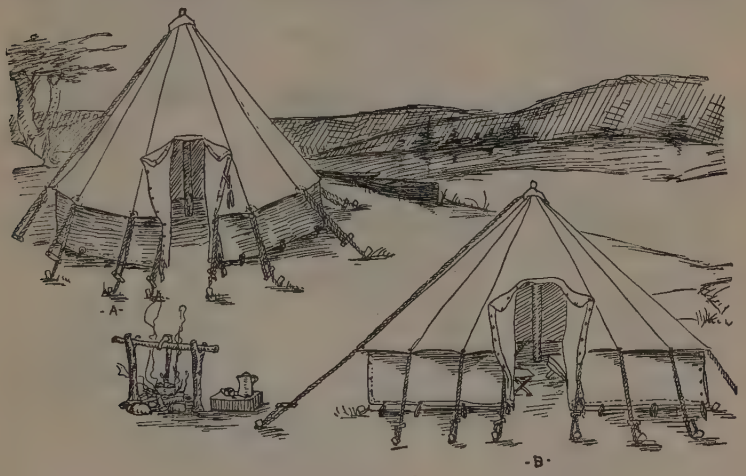


FIGURE 12

is the fact that it may be pitched with only one pole, and shelters more men for its weight and canvas than any other tent. Either the Sibley or the conical wall, shown in Figure 12(B), is splendid for gipsy camps, especially if the party is large and tentage must be kept at a minimum. Such tents can often be secured at a low price from the various concerns that handle condemned army goods. Many of them are as good as new, and are an excellent equipment to own for permanent camps. The fact that their pitch is so great causes them to shed water readily, and consequently no fly is necessary for ordinary weather. The larger sizes can be heated. (See Figure 13.)

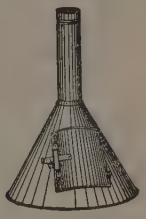


FIGURE 13

Figure 14 shows the common Indian tepee. With some it is still a favorite, but, in general, either the small wall tent or one of the sportsmen's models, according to climate and conditions, is better. There is a romance and an appeal in the tepee, but for practical camping there are better arrangements. Even the Indian gives it up for a good wall tent when he can

FIGURE 14

afford to, notwithstanding the fact that it is the only tent in which an open fire can be comfortably and successfully handled. Some authorities still claim it the best canvas shelter for all climates and conditions, but on this point there seems to be a marked difference of opinion.

Figure 15 suggests simple yet satisfactory ways of stretching a stout fly for mess tent and cook shack. Where the camp is to be a long-term camp, or permanent, it will be more satisfactory to stretch the fly over permanent wooden frames and

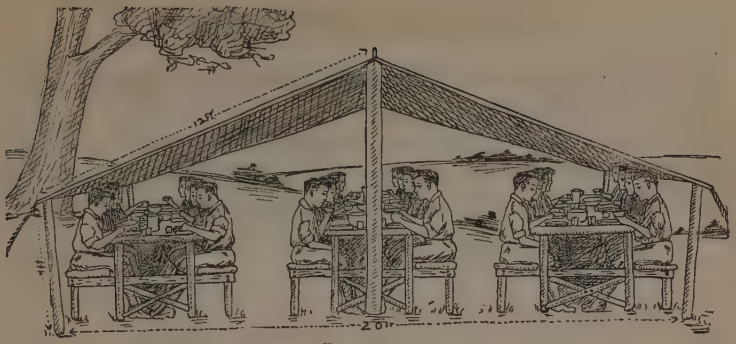


FIGURE 15

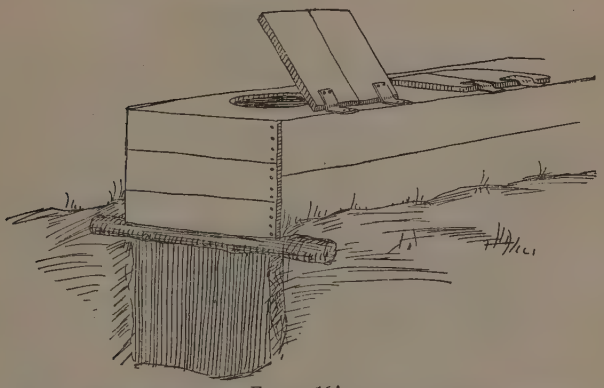


FIGURE 16A

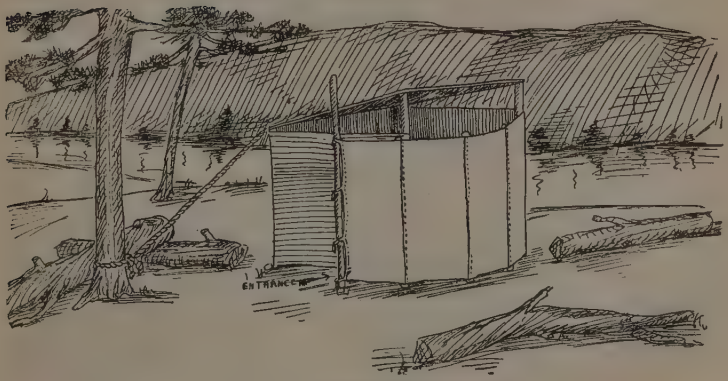


FIGURE 16B

tie them down. It is often very difficult to keep such large flies staked fast with ordinary tent pegs.

Figures 16A and 16B show a simple but effective latrine, especially suitable for large or long-term camps. (Interior arrangement discussed with sketches under "Making Camp," on page 336.)

TENT MAKING MADE EASY *

By H. J. HOLDEN

THE accompanying sketches show a few of the many different tents which may be made from any available piece of cloth or canvas. The material need not be cut, nor its usefulness for other purposes impaired, except that rings or tapes are attached at various points as indicated. For each tent the sketches show a front elevation, with a ground plan, or a side view; also a view of the material laid flat, with dotted lines to indicate where creases or folds will occur. Models may be made from stiff paper, and will prove as interesting to the kindergartner in geometry as to the old campaigner in camping. In most of the tents a ring for suspension is fastened at the center of one side. This may be supported by a pole, or hung by means of a rope from any convenient fastening; both methods are shown in the sketches. Guy ropes are required for a few of the different models, but most of them are pegged down to the ground.

After making paper models, find a stack cover, a tarpaulin, a tent fly, an awning, or buy some wide cotton cloth, say 90-inch. All the shapes may be repeatedly made from the same piece of material, if the rings for changes are left attached. In Figures 3, 4, 6, 7, 8, 9, 11, a portion of the canvas is not used and may be turned under to serve as sod cloth, or rolled

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up out of the way. If your material is a large piece, more pegs and guy lines will be required than is indicated in the sketches. The suspension ring, 1½ inches or 2 inches in diameter, should be well fastened, with sufficient reinforcement to prevent tearing out; 1-inch rings fastened with liberal lengths of tape are large enough for the pegs and guy lines. Also reinforce along the lines of the strain from peg to pole.

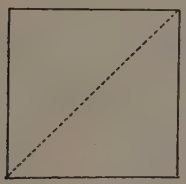
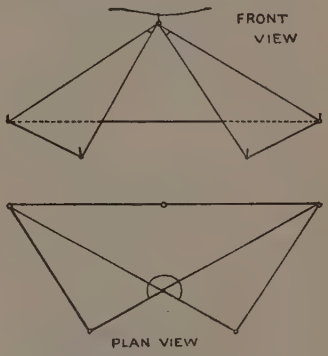


FIGURE 1.—TENT FROM A SQUARE OF CANVAS

A 7 x 7 sheet is ample for a one-man shelter; 9 x 9 will house two



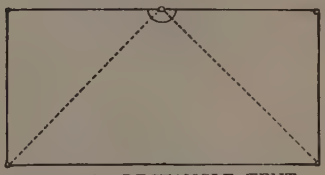


FIGURE 2.—RECTANGLE TENT

Figure 1.—A square of material hung by one corner, from any convenient support, in a manner to make a comfortable shelter; it will shed rain and reflect heat. This square makes a good fly or a good ground cloth for any of the tents.

Figure 2.—A rectangle equal to two squares. A shelter roomy and warm, with part of one side open toward the fire.

Figure 3.—Here the rectangle is folded to make a "lean-to" shelter, with the roof front suspended from a rope or from a horizontal pole by means of cords. The two corners not in use

are folded under, making a partial ground cloth. A square, open front is presented toward the camp fire.

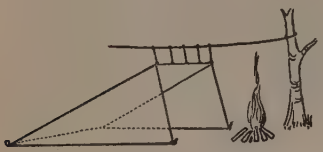
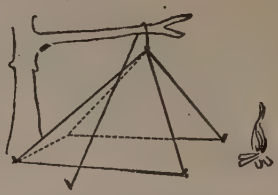


FIGURE 3.—BAKER, OR LEAN-TO



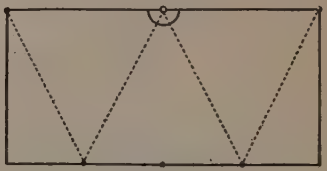
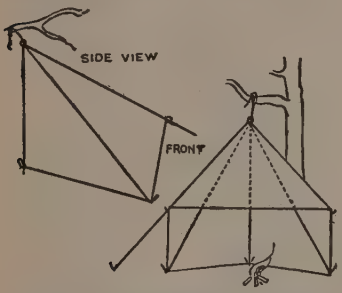
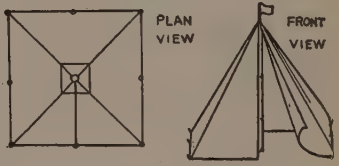


FIGURE 4.—ANOTHER BAKER, OR LEAN-TO





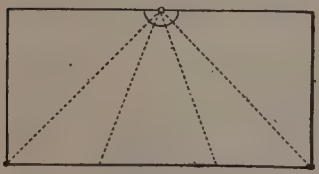


FIGURE 5.—THE TOQUE TENT

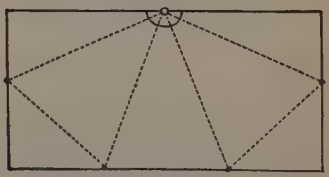


FIGURE 6.—MINER'S TENT

Figure 4.—Same in plan as No. 3, but has a triangular front and only one point of suspension.

Figure 5.—Uses all the cloth, has a triangular ground plan, a square front opening, plenty of head room at the back and

requires two or more guy lines. This shelter resembles a "toque."

Figure 6.—Square or "miner's" tent. Two corners are turned under. This tent is inclosed on all sides, with a door in front.

Figure 7.—Conical tent or "wigwam," entirely inclosed,

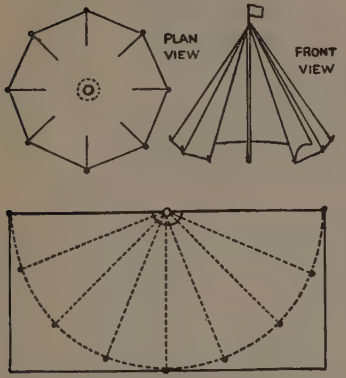


FIGURE 7.—CONICAL TENT, OR WIGWAM

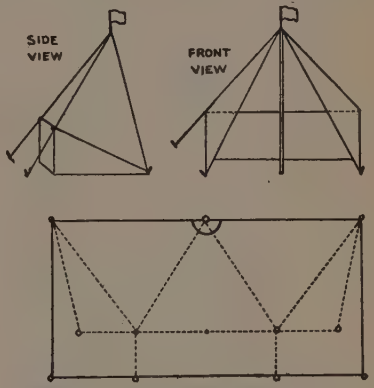


FIGURE 8.—SO-CALLED CANOE TENT

Requires three guy lines, and can be supported by a rope instead of a pole

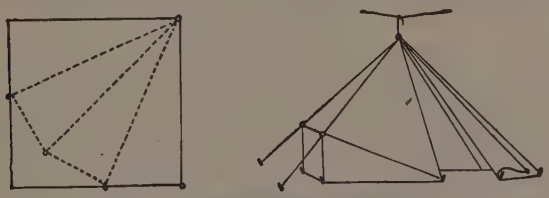


FIGURE 9.—CANOE TENT WITH FLY

with door in front. Two corners of the canvas are turned under.

Figure 8.—Has a wall on one side and is called a "canoe tent" in some catalogues. It requires two or more guy lines and is shown with a pole support. The front has a triangular opening.

Figure 9.—A combination of Figure 8, with Figure 1 in use

as an awning or fly. This sketch shows both tent and fly suspended by means of a rope. The "awning" may be swung around to any angle.

Figure 10.—Combination of Figures 1 and 2; they may be fastened together by a coarse seam or tied with tapes. The

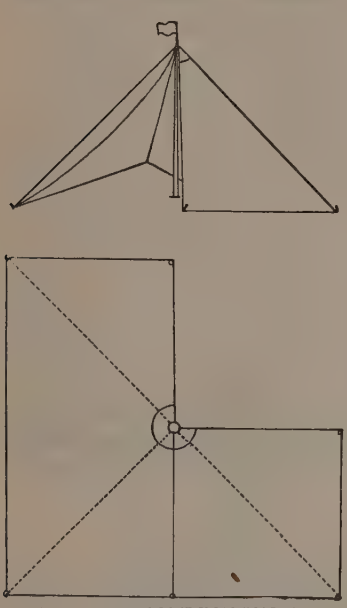


FIGURE 10.—COMBINATION OF FIGURES 1 AND 2

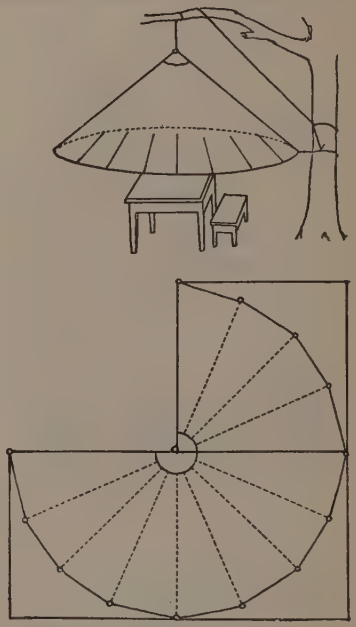


FIGURE 11.—SIBLEY AWNING

ground plan is an equal-sided triangle, with a door opening on one side, as shown. There is no waste cloth.

Figure 11.—No. 10 changed to a conical shape and suspended as a canopy. The circular shape is secured by the use of small-size gas pipe or limber poles bent into a large hoop. Of course, guy lines may be used, but would probably be in the way. Notice that a little more material for making a wall would transform the canopy into a Sibley tent.

There are other shapes and combinations, but perhaps these sketches are enough in the line of suggestion.

The diagram Figure 12 shows a method for laying out, on your cloth, the location of all the rings to make the tents and shelters. No dimensions are given and none is required. The diagram is good for any size. Most of the fastenings are found on radial lines, which are spaced to divide a semi-circle into eight equal angles, 22½ degrees each; these intersect other

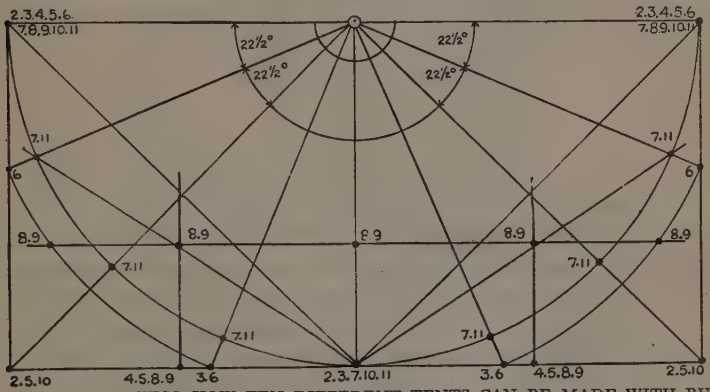


FIGURE 12.—SHOWING HOW TEN DIFFERENT TENTS CAN BE MADE WITH BUT ONE PIECE OF CANVAS

construction lines and locate the necessary loops and rings. Figures are given at each ring which refer back to the sketch numbers.

Suppose the material at hand is the widest unbleached cotton cloth, 90 inches wide, 5 yards long, or 7½ feet by 15 feet. The table on page 74 will give the dimensions for the various shapes from Figure 1 to Figure 11.

If in doubt about the location of rings on your canvas, suspend the tent by the center ring and fasten the loops temporarily by means of safety pins, draw the tent into shape and shift the fastenings as required. The guy lines should have hooks or snaps at one end for ready attachment and removal; the other end should be provided with the usual slides for

"take up." The edge of the cloth where the large ring for suspension is fastened should be bound with tape or have a double hem, for it is the edge of the door in most of the tents shown.

TABLE OF DIMENSIONS, 90-IN. MATERIAL

Size	Area, Sq. Ft.	Height, Ft.	Remarks
1.....7½ ft. triangle	25	6¼	One side open
2.....6½ x 15 ft.	65	6¼	" " "
3.....6 x 7½ ft.	45	4½	" " "
4.....7½ x 8 ft.	60	5½	" " "
5.....7½ ft. triangle	25	7½	" " "
6.....6¼ x 6¼ ft.	39	7	Inclosed
7.....7½ ft. diam.	44	6½	"
8.....5 x 7½ ft.	37½	6½	2½ ft. wall
9.....7½ x 8 ft.	60	6½	No. 8, with fly
10.....15 ft. triangle	97	6¼	Inclosed
11.....11¼ ft. circle	108	5	Canopy, no sides

WATERPROOFING A TENT

Dissolve half a pound of alum in two quarts of boiling water, then add two gallons of pure cold water. In this solution place the material and let it remain for a day. Dissolve a quarter of a pound of sugar of lead in two quarts boiling water, then add two gallons of cold water. Take the material from the alum solution, wring it lightly, place in the second solution, and leave for five or six hours; then wring out again lightly and allow it to dry.

If you want to avoid trouble with a leaky tent, the following solution is a "sure cure." Take a gallon or two gallons of turpentine and one or two cakes of paraffin, drugstore size. Chip the paraffin fairly fine; dump it into the turpentine. Place the turpentine in a pail and set same in a larger pail or a tub of *hot water*. The hot water will heat the turpentine, and the turpentine will melt the paraffin. Stir thoroughly, and renew your supply of hot water if necessary. Then pile your tent into a tub and pour in the turpentine and paraffin mixture. Work the tent all over thoroughly with your hands, so that every fiber gets well saturated. You must work fast, however, as the paraffin begins to thicken as it cools; and work

out-of-doors, in a breeze if possible, as the fumes of the turpentine will surely make you sick if you try it indoors. When you have the tent thoroughly saturated, hang it up to dry. It is not necessary to wring the tent out when you hang it up. Just let it drip. If you use too much paraffin the tent may look a little dirty after it dries, but it will be all right after you have used it once or twice.

GENERAL PARTY EQUIPMENT

By FRANK H. CHELEY

Beds

A WARM, comfortable bed is an absolute essential. Animals can curl up in the lee of a great log, or under the protecting arm of an overhanging cliff, but not so the ordinary camper. Your bed is of more importance than your shelter,

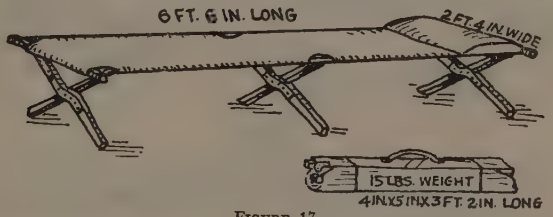


Figure 17

and should be cared for in advance, insofar as is possible. Seasoned campers that are used to the go-light trips become expert at making a one-night bed, with the aid of dry leaves, small brush and the like, along with their blanket, light sleeping bag, sweater, or combination of them all. Such beds are largely a matter of ingenuity and resourcefulness, and vary in details for every season as well as section.

If the camp is to be reasonably permanent, some permanent form of bed should be planned. The folding army cot (Figure 17) is widely used and can be supplied by any outfitter.

However, these are expensive, and unless great care is taken with them, do not last long. For certain sections at least, they are cold, and campers prefer to be on the ground. In this case, a good tick filled with straw is often satisfactory. Straw, hay, marsh grass, leaves and the like can usually be found in the neighborhood of the camp in sufficient quantities for at least a small group.

If space is limited in the tents, and the climate is reasonably mild, probably the simple double-deck canvas bunk that any boy can make himself will be found most serviceable as well as economical. These bunks can be made at home, knocked

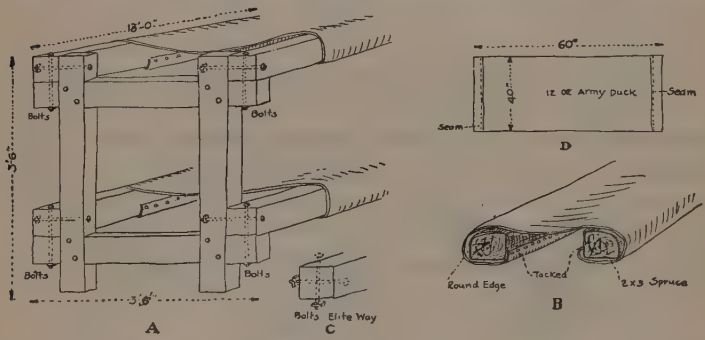


FIGURE 18

down and shipped in a bundle and be erected on the camp site, with aid of a small monkey-wrench.

Figure 18 gives the details of construction, measurements and the like. Use clear select lumber either of spruce or fir. Use two bolts in each joint of the uprights, as well as a slight mortis. This stiffens the bunk and eliminates the squeak. Use at least 14-ounce double-filled duck, well hemmed at each end, and tack it to the sides with large-headed tacks. Drill bolt holes both ways as per 18C, in order that the exact amount of slack may easily be removed from the canvas. For bolting the rails to the ends, use winged nuts with washers for convenience.

The bunks may be made double length, if desirable, thereby eliminating one end piece. However, this makes long, heavy rails (thirteen feet), with an increased danger of breakage in shipping. Four of these single-length beds will conveniently go into a 12 by 14 tent, making sleeping room for eight boys, with ample room under the lower deck and at the sides for baggage, clothing and the like.

If it is necessary to protect yourselves from mosquitoes, these beds are very easily screened in with cheesecloth, with the aid of a few straight small saplings or strips of lumber (see illustration). Such beds will last for years, if taken care

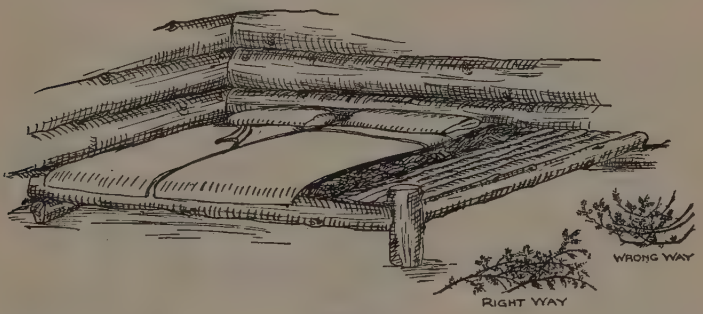


FIGURE 19

of; are roomy, sanitary, and inexpensive. The main objection to them is that they are not "woodsy" enough for a real camp.

If you are camping where there is an abundance of pine, spruce, fir, or balsam, probably the well-made browse bed is the thing you want. Do not be misled, however, into believing that a browse bed is merely a pile of green boughs upon which you sleep. One night on such a contrivance will convince you to the contrary. A real browse bed must be built with the utmost care and along certain lines. First, carefully clear the ground of all litter, sticks, stones and the like, and stake out a frame with four to six inch logs the size of the desired bed (3 by 6½ feet for one person, 5 by 6½ for two).

Then with a shovel or sharp stick, dig a slight "hip hole" in the proper place. You are then ready to thatch your bed. Cut only the lower limbs of the trees, taking care not to damage them nor to cut any of them down. Lay smoothly one

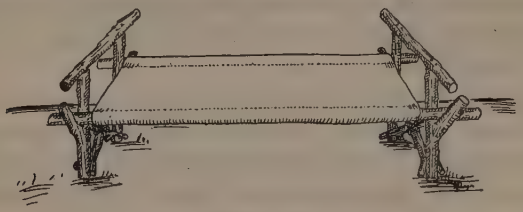


FIGURE 20A

layer of the larger fans, *convex side up*, butts toward the foot, taking care to fill in clear to the edges all the way round. Now with smaller and more select boughs, thatch-in full and thick (breaking off all unnecessary stems) by thrusting the

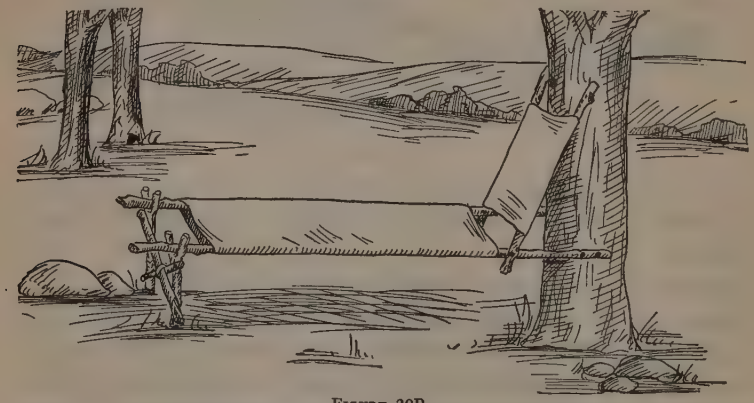


FIGURE 20B

butt-ends underneath the layer already placed, in such a manner as to leave the fans-ends curved up and down toward the foot of the bed. Make it good and thick; and when completed, spread your poncho or tarpaulin over it, then your blankets, and you have a real bed. Boughs for beds should

never be cut while wet, unless absolutely necessary, as they will hold the dampness and make a cold, uncomfortable bed.

If your camp is a cabin or a shanty, the browse bed may be made just the same, but materially improved, at least as to length of life, by first arranging a slightly elevated spring of select straight saplings trimmed smooth. These should

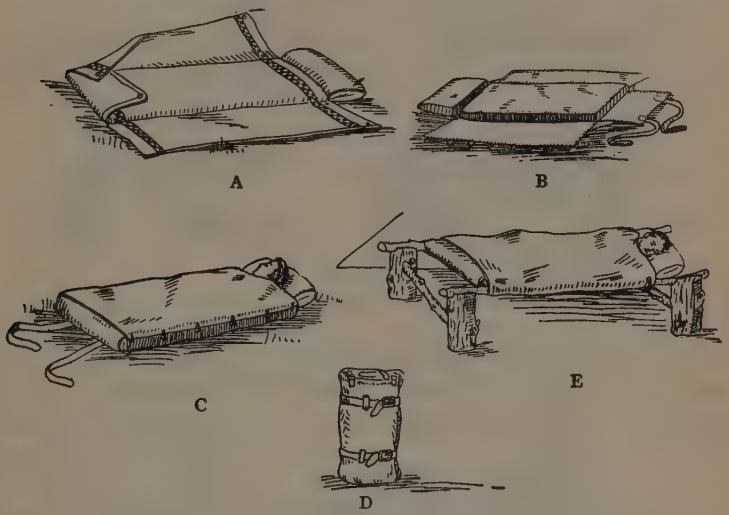


FIGURE 21

invariably be laid up and down and never crosswise. (See Figure 19.)

Another simple outdoor bed can be made by driving four posts in the ground and nailing to them a simple frame of saplings. Either tightly stretched rope woven back and forth, or a stout canvas made for the purpose, may then be attached. A thin layer of boughs may be added to advantage, if these are cut fine so as to entirely eliminate "hard spots." A and B of Figure 20 are suggestive, if you choose this sort of a bunk.

For certain locations and types of camps, probably some

kind of a sleeping bag must be resorted to. They are, generally speaking (all save the pneumatics), heavy, expensive, and unsanitary, unless time is taken thoroughly to air and sun them every day. In Figure 21 are shown the common types. For prices and details, see any camp-outfitter's catalogue.

Special Cooking Kits

The main kitchen stove, if it is for a permanent camp, will likely be some type of a regular camp range, which can be

Figure 22

secured in any desirable size; but in addition to this, there should be included in your equipment, regardless of the type of camp, at least some simple stove or camp grid for all-day trips or little journeys away from camp; for short cruises or for special outdoor suppers in connection with corn roasts and the like. These can be made, or purchased, just as you prefer. Some campers think there is nothing so good for the purpose as a piece of sheet steel that can be quickly adjusted to two logs or flat stones, and a

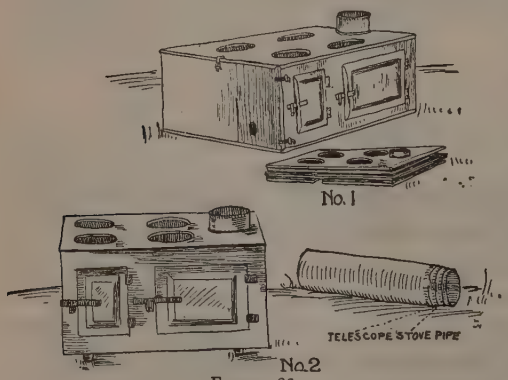


Figure 23

fire built underneath it. An amazing number of fish or flapjacks can be fried on such a stove in a little while. However, it is not suitable for all occasions because of its weight.

In Figure 22 are shown two simple, inexpensive camp grids

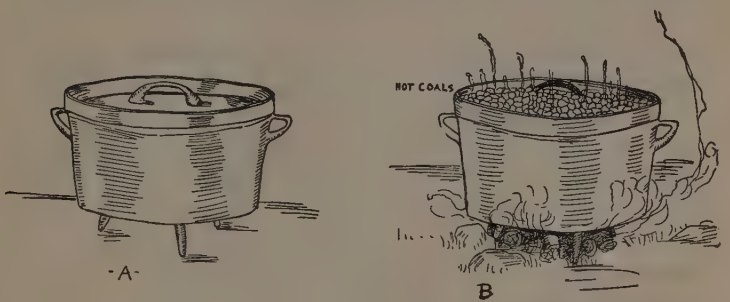


FIGURE 24

that can be secured from an outfitter, or easily made from the electrically welded wire shelf of any old gas range. If you have individual cooking kits, these grids are light and serviceable,

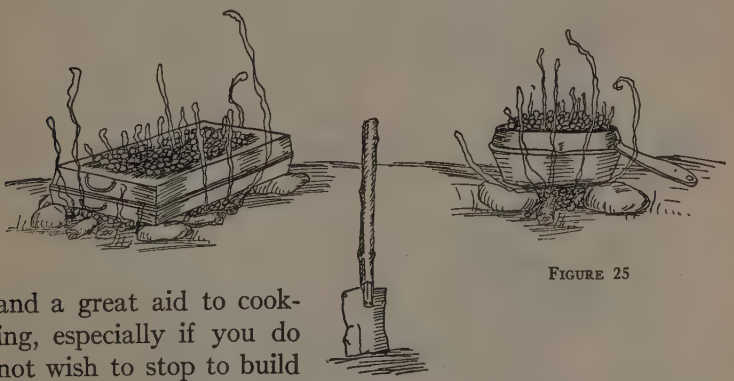


FIGURE 25

and a great aid to cooking, especially if you do not wish to stop to build a standard cooking fire with dressed logs. (See "Camp Cooking" this volume; also Figure 23.)

Figure 23 shows two common types of light sheet-iron stoves that are used extensively on gipsy trips and the like. No. 1 completely folds up, while No. 2 must be carried as it is. Both

are supplied with telescoping pipe when desired. If you must resort to such a stove for the general camp cooking, which sometimes happens, by all means add a Dutch oven to your outfit for cooking bread, corn bread, biscuits, pot roasts, etc.

Figure 24 shows the common Dutch oven. It is simple to operate, and can be secured in various sizes and weights. Experienced campers with plenty of time on their hands and the inclination to get on with the absolute minimum of equipment, can often make a temporary Dutch oven by turning two kitchen pans together, taking care to have plenty of hot coals, and a simple shovel made of a tin container and a green stick, so that the coals may be replenished or removed at will. Most delicious camp dishes may be cooked in this manner, if in choosing your kitchen equipment you keep such emergencies in mind and make them possible. Figure 25 will be suggestive along this line.

Chairs

Have you even been in camp where there wasn't a blessed place to sit down, except a near-by old stump, or perhaps a log that nature was busy rotting away into plant food? Every grocery box has been turned into a part of the kitchen cabinet, the camp chests are doing duty in the mess tent, and—well, there simply isn't anything to sit on, unless you thought of that very contingency before you started, and included in your outfit a couple of durable, comfortable, folding camp chairs. Fortunately, such chairs are simple to make and cost little.

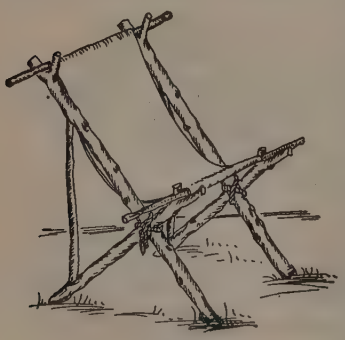


Figure 26

Figure 27 suggests several types, from a very simple stool

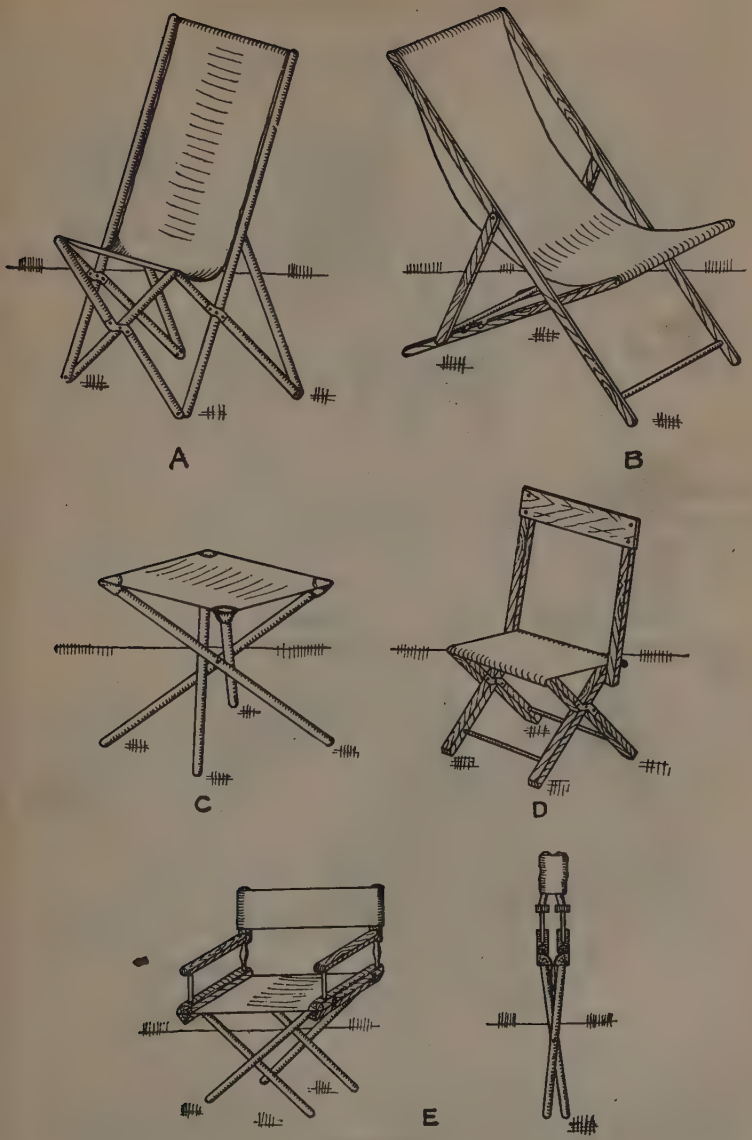


FIGURE 27

to a good, comfortable camp chair. If you do not care to construct them yourselves, they may be purchased from camp

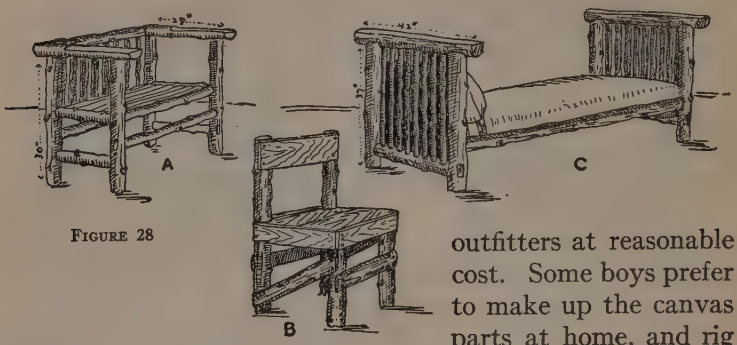


FIGURE 28

outfitters at reasonable cost. Some boys prefer to make up the canvas parts at home, and rig up the wooden parts in camp from crotches and poles. If you have a knack for such construction, Figure 26 will be suggestive.

If your camp is to be used year after year, and there is any

FIGURE 28D

sort of a place for storage, you may wish to go into the matter a little more elaborately. In that case, Figure 28 will be sug-

gestive of what you can easily do with plenty of time, poles, nails, and a lot of originality. Old stumps often furnish a basis for a comfortable camp seat. It is also sometimes convenient to rig a comfortable camp bench between two trees, or in a very low crotch of a single tree. Such benches are delightful to curl up on in the heat of the day, to read to write, to dream, or to chat with a pal.

Tables and Benches

Unless your camp is a pack trip or a go-light hiking trip, you must plan some sort of a table. If your party is small, prob-

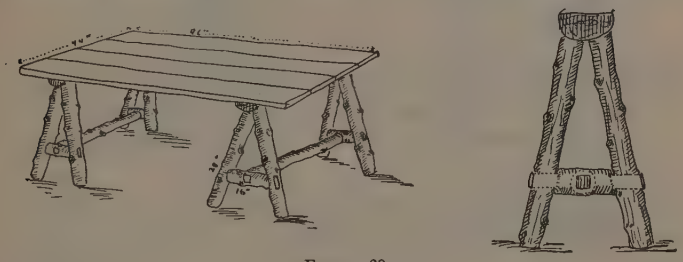


Figure 29

ably a table will be rigged from the tops of the camp chests, or from boards taken from packing cases. If your equipment is moved in a wagon, it may be worth your while to construct a

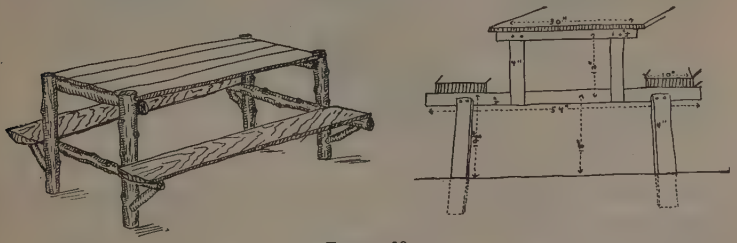


Figure 30

light, durable, folding table, but for most purposes, it is most convenient, as well as economical, to build your table after you get into camp, either from common sheathing taken along

for the purpose, or purchased at a near-by farm or sawmill. If there is a handy man in the party, splendid use can be made of rustic poles in building the horses, as in Figure 29. A very satisfactory table, used extensively in boys' camps, is a com-

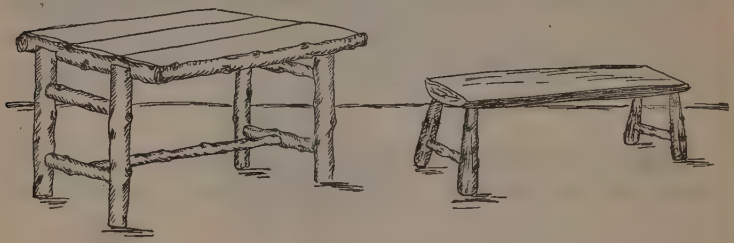


FIGURE 31A

bination of table and benches built in one, as per Figure 30. These may be made in any size to accommodate any number. If taken down carefully at the end of the season, much of the

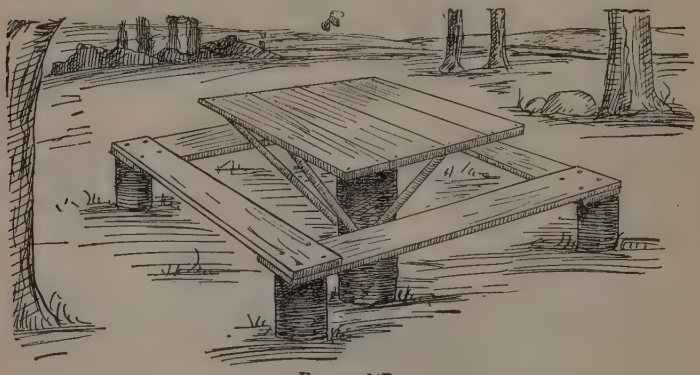
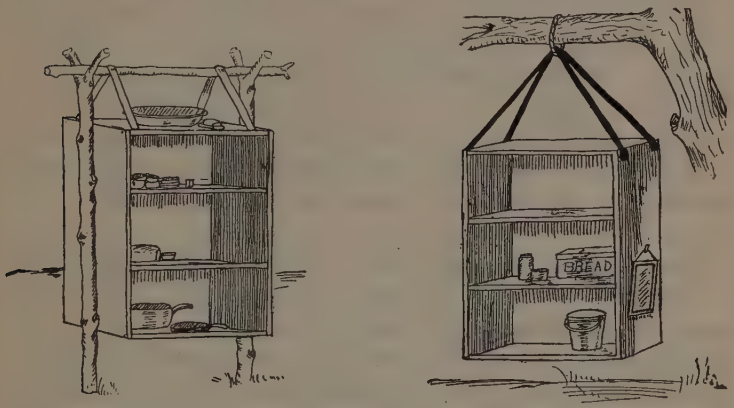


FIGURE 31B

lumber will be as good as new, and can be used over and over again.

In small camps where there is a handy man, a permanent table, such as Figure 31 (A and B), can easily be built with very little material from the outside, and the folding camp stools or rustic slat stools pressed into service at meal-time.

There is need in every permanent camp of a few simple sets of shelves for shaving purposes, for toilet articles, for books and magazines, etc. A small grocery box fastened to a tree will serve all purposes, or a set of folding shelves can be made of light wood, as per Figure 32A, and shipped in one of



A B

FIGURE 32

the camp chests. Smaller camp chests can easily be made, shipping them to camp full of equipment and supplies, and then converting them into a tree cabinet, as in Figure 32 B.

A steamer trunk makes an excellent camp chest, is light, durable, and convenient to lock and to ship.

CAMP TOOLS

In the temporary camps, a real camper can make his pocket or sheath ax serve him as a whole kit of tools, provided, of course, he keeps it sharp. In a permanent camp, however, or even a long-term camp, a few good quality common tools will always pay their way. There should be a common knockabout ax for the use of the "chumps" who insist on chopping down rock piles; and in addition, a good ax for the real camper. It should not be heavy, but of excellent quality, properly

ground and, equipped with a stout leather muzzle-end, reserved for cutting wood only. This does not mean, by a greenhorn. The wood ax should be kept in the mess tent, and with it should be a round (sportsman's) carborundum stone, coarse on one side and fine on the other. The handles of both axes should be carefully wedged and wired on, as per Figure 33. It is bad enough for a camper to lose his head, but an ax that loses its head in camp is not only an abomination, but a positive danger. Extra, select helves should be included for both axes.

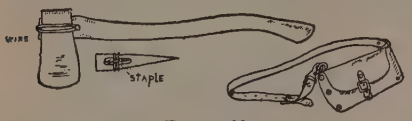


FIGURE 33

There should be at least one durable light-weight, long-handled shovel, a flat file to keep it in repair, and if space will permit, an extra handle will not come in amiss. Add to these a good claw-hammer, a medium log saw with extra attachable handle, and a saw file. A heavy canvas bag of assorted common nails, including a can of tacks, a few hooks and screw-eyes, will be many times a blessing. A stout brace with one-half, three-quarters, and a one-inch bit, will serve a thousand purposes, if there is camp furniture to make.

Then, of course, there will be a common eight-point saw and a sharp draw-knife, a pair of pliers, and, if possible, a medium cold-chisel. A good carbide lantern will be kept handy for emergencies, and a coil or two of extra rope for clotheslines, and a few bits of stout wire will come in handy. A strong iron rake will insure a cleaner camp, especially if there is much pine-needles and forest litter about.

Also include a piece of sheet steel, two feet square, with a small hole in one corner of it which will allow it to be suspended from a tree by a wire. Use it to call the hungry campers to meals three times a day. (Better than a bugle, unless a bugle is thoroughly well blown.) The steel, as suggested, will prove much more satisfactory, and can always be depended

upon "to be around when needed." I was in a Rocky Mountain camp one summer, when the ingenious campers had bent a steel mine shaft into an open triangle and suspended it from the convenient limb of a great pine. The three tones from this triangle, caused by striking it with a hammer, could be heard for miles in the hills, and was always a signal to come to camp at once.

All camp tools should be kept in a convenient, designated place, and should never be taken away without first signing up a simple tally arranged for the purpose, giving the initials of the borrower and the approximate time of day of the loan, checking each item off when the tool is returned. In no other way can tools be kept track of through a season in a boys' camp, regardless of how many of each variety is supplied.

Latrines and Garbage Disposal

The camp latrine is often a very big problem. If you want to know just what sort of folk any party are, investigate the latrine. Too long we have had the idea that anything would do, when, as a matter of fact, it of all things should be a clean, sanitary place. Many times they are allowed to become so offensive that campers use the open to avoid them, and of course, when there are more than two hikers, that is contrary to every law of good camping. Some merely use a rail and a pit, always having a shovel handy with which to keep fresh dirt in the pit. For a very small party on a very brief camp, this may be made to serve, but at best it is only a makeshift. A far better way is to include in your equipment a well-made set of holes, the number of holes in the set to be determined entirely by how many campers there are in the party. Each seat should then have hinged, just back of the opening, a convenient top lid, well cleated to keep it from splitting. Such an affair can easily be shipped along with the other equipment; and with it and a few boards, a rough yet fly-tight box can be quickly constructed. Set the box on stout poles placed across

the ends of the pit, and then bank in well with brush and dirt. If no boards are available, make a frame of poles upon which to place the seat-board, then close it in with building paper, old canvas, or the like.

Pitch the latrine tent (Figure 16 B) about your seat, arrange a sapling back of each separate lid so that it can never be left open, and you have a simple, inexpensive, sanitary latrine. When the camp is over, burn your boxing, and cover the pit well with earth.

Plan well in advance for your garbage disposal. Take along a garbage pail with tight-fitting lid and keep the pail clean. Swat the fly at the garbage pail by starving it to death. If your garbage is of small quantity, burn it in the stove in a fire made for that purpose. If there is considerable of it, build a simple incinerator of stones. Empty your garbage into it so that the liquid will drain off easily, and burn the solid matter right in the incinerator. If you have quantities of garbage and can possibly do so, arrange with a near-by farmer to call for it at stated intervals for his hogs or chickens. Some campers bury it, and that may be your only way out, but if so, do it so thoroughly that squirrels and other rodents will not be tempted to dig it out and examine it, taking away only what they want. The very worst sort of garbage is fish heads and entrails, and these should be buried deeply while yet inoffensive. In this connection, a bit of stout wire fence coiled into an open cylinder makes an excellent incinerator for papers, cartons, and the like. It also may be left behind at the end of the season without loss.

Miscellaneous Other Equipment

Kitchen equipment, including regular stoves, cooking dishes and the like are all discussed in the section on the Commissary. Likewise hospital and medical kits and supplies are discussed thoroughly, further on, in "Personal Health, Sanitation, and Camp Remedies." Let us turn our attention for

a little while to a few miscellaneous items that we need to consider before we talk about the contents of our own duffel bags.

There should be at least one good camp chest, and two are preferable. It is best to make these from select lumber, putting them together with stout screws. They hold better and leave no sharp ends. Camp chests should invariably have rope handles, and not be so large that when filled they are impossible to lift. The lids of the chests should be well cleated

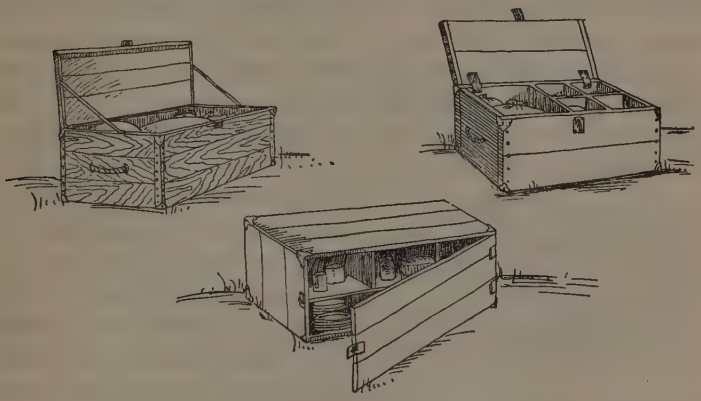


FIGURE 34

and arranged so that their underside can be used for bread boards and kitchen table tops, if necessary. It will pay to give old camp chests a couple of good coats of dark, serviceable paint, and put light brass corners on the bottoms. If the chests are to be carried much in a wagon they should be sized with that in mind. About 36 inches long by 24 inches wide, and 24 inches deep inside, is a convenient, durable size. (See Figure 34.)

Don't forget a good size, all-wool bunting flag, with necessary rope and pulley. No doubt, a young hickory, pine, or other straight young tree can be found as a flagpole. Dress it smooth at the upper end with ax or draw-knife, wire the

pulley in place, and plant it deep, with rocks well tamped in at the base. Ofttimes a suitable tree will be found that need not be cut at all. Simply top it and cut the branches clean. Raise the flag each morning with a simple ceremony, and lower it at sunset, or just before the evening meal, with all at attention. Add a camp pennant of sufficient size to fly *beneath* the Stars and Stripes, if your camp is a reasonably permanent one. This can be made of canvas drill, or other stout material, and should be equipped with brass grommets the same as the regular flag. If small harness snaps are securely topped to the rope at the proper distance apart, they will greatly facilitate the flag-raising and be economy on the flag, by allowing it to fly free and yet true.

An old wash-boiler will make a splendid thing to pack dishes or small kitchenware in, and will be very serviceable in camps for a number of purposes. It will be a dandy bread-box. It can be settled deep in the stream and held in place with a rock, and used as a cooler for butter, eggs, etc., or even buried in the ground in a shady position as a food container. A first-class oven may also be made of it by burying it in a convenient bank, completely surrounding it with a layer of well-fitted stones. Build a good hot fire in the boiler and keep it burning for several hours to thoroughly heat the rocks and surrounding ground. When you are ready to bake, and the fire in your improvised oven has burned low, rake out the ashes, quickly place your baking in, close the lid, and prop it shut with a heavy pole. Meat, fish, and the like may be left in such a baker all day, and be in ready shape for the evening meal. (See Figure 35.)

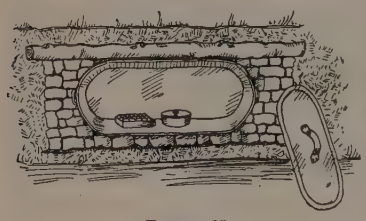


FIGURE 35

If you are going to be compelled to use ice for fresh meat, milk, and other perishable foods, you must plan some sort of a

simple ice-chest. A good way is to ship equipment in two especially prepared square boxes, that when emptied will nest one inside the other, leaving three to four inches on all sides. Bore a half dozen holes in the bottom of the boxes, so that when they are nested the holes will exactly match. Line the bottom of the inside box with tin or zinc, and arrange both lids so that they fit in flush with the top of each box. Pack the open space about the sides with straw, grass, moss, wet leaves—whatever you can find that will make a good insulator. Place your ice in bottom of the inside, well wrapped in cheese-cloth or burlap, and place your perishable food on it and about it.

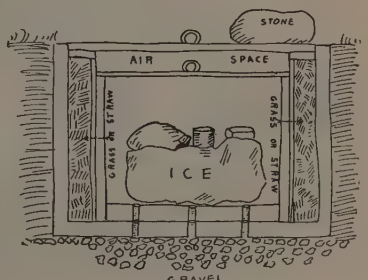


FIGURE 36

Such a box should be kept in the woods, never in a tent, and arranged so that it will drain easily. Any boy can build such an ice-box that will be a joy and make possible many a desirable and healthful change in the menu. (See Figure 36.)

In case it is entirely impracticable to get ice, a satisfactory camp refrigerator may be contrived on the same principle as above, by circulating cold spring water through the space stuffed with grass, moss and the like. If this plan is resorted to, a bit of pipe should be taken along to feed the box; and the drainage holes, instead of being in the bottom, should be around the sides of the outer box only and pretty well to the top. These should always be numerous enough to care for the amount of water admitted to the chest, but should be small, distributing the exhaust so as to keep the outside box wet. Needless to say, both boxes should be made of matched lumber.

Still another way that is simpler than either of the above is to bore numerous holes through a good vinegar barrel, keeping

FIGURE 37

the holes all within say a foot of the bottom. Sink the barrel in the stream by means of a heavy rock inside of same, allowing the cold stream water to circulate in and out through the holes. Shelves for food may be rigged above the water line, and a close-fitting top arranged. This sort of a contrivance will hold quantities of food, and may be left behind at the end of a season. (See Figure 37.)

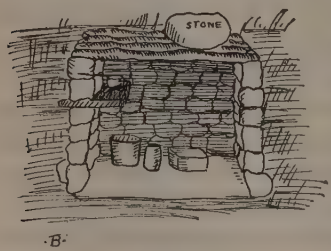


FIGURE 38

In case you are so situated that it is not wise to take a barrel with you, a very satisfactory cold place may be built in a

shady spot, or even in the stream by means of stone. (See Figure 38.) A wooden top for such a cellar may either be taken into camp with you, or built on the ground. Care should be taken to keep these contrivances clean and wholesome.

Personal Equipment

Having pretty thoroughly cared for general equipment, let us now turn to a consideration of our own camp chest, or duffel bag, as the case may be. You will realize at once that it would be foolish to even try to list all the things that the great variety of campers, camping under every given condition you can imagine, might unhesitatingly insist as being essentials to a personal kit. Many of the very things that a camper might use in a given region every day of his outing, would likely lie untouched during the whole trips in some other camper's kit in a different section; so you can see it is difficult to generalize when it comes to personal equipment.

It is always a good plan to bear in mind that equipment never makes the camp. Equipment, outside of food, blankets, and an ax, is invariably supplementary. Don't ever be led into the belief that you can't camp because you have no funds with which to buy the necessary where-with-alls. There isn't a boy in America who cannot have a camp equipment if he has resourcefulness. Chauncy Evans, that veteran camper and outdoor philosopher, makes several pertinent suggestions along that line. He says there are many boys to-day who pore over books on camping and outdoor magazines, "with the same hopeless feeling that he reads about the international yacht races. He can't camp without bedding, and Ma won't let him have her best blankets. Besides, they are white ones, and whoever heard of a real camper, like Dan Boone, rolling up with his trusty rifle in a *white* blanket?" He, however, suggests that a good ticking can be made of a few gunny-sacks or grain-sacks, washed and sewed together, filling the tick later

from dry cat-tails, dry leaves or the like. Such a bed costs nothing but ingenuity. He further suggests that,—

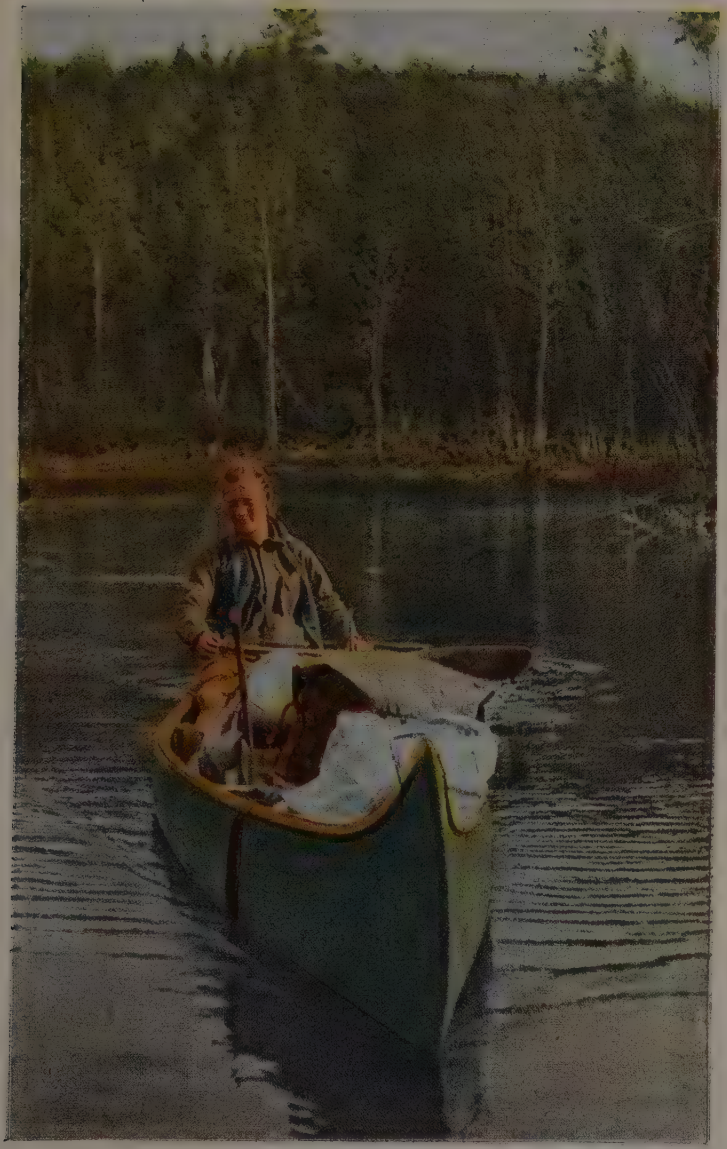
"Any boy worth his salt can rig up a very battered but practical cooking outfit from the kitchen discard; then, too, one can do wonders with a pile of old tin cans by melting off the tops, punching holes in them with a nail, and equipping them with copper wire bails. Thus one can have excellent coffee-pots, kettles, and even a lantern. By selecting the right sized cans, one can have them 'nest' nicely, almost as close as the fancy, high-priced aluminum ones that Dad uses. With the addition of an old pieplate or two, for fry-pans and a kitchen toaster, you are fixed.

"Everybody has old clothes. They are just the thing for camping; and when it comes to a shelter, a roll of tar-paper and a few nails will make as fine a camp shelter as was ever invented."

Such equipment has often been the beginning of a more elaborate and better suited outfit. Needless to say, no camper, no matter how seasoned and experienced, ever develops a personal kit that is "just exactly right." He never camps but he wonders why he didn't think to bring along this or that, or regret that he took some friend's advice and toted such-and-such along every step of the way, with space at a premium. A personal camp kit, so far as details are concerned, is only gotten together, with any degree of satisfaction, after much experimenting and actual experience.

Of course, the prime essential of all personal equipment is that it be serviceable, that it meet your need, and that it keep you comfortable. If it meets these simple conditions, it is well along toward a satisfactory personal camp kit.

All clothing, save towels and handkerchiefs, should be woolen, generally speaking. This does not mean that you should not have a few old soft shirts of cotton, if you like, but there should be flannel ones, too. Woolen clothes are cooler



MOVING CAMP

Courtesy of Fred R. Abbott

A COZY HOME IN THE WOODS

in hot weather and warmer in cool weather than any other type of clothes. A good woolen sweater is worth two coats (unless they be of the leather variety now used extensively by campers and sportsmen). One all-wool, army-type blanket is worth a half dozen cotton blankets, comfortables and the like, and outing-flannel pajamas never come in amiss. A wool cap or old soft hat is the best headgear. Take heavy woolen socks or stockings, if there is to be any tramping to speak of. If not, light-weight wool ones will prove much more comfortable than cotton, and save many a foot-wetting from having bad results. Yes, use wool just as far as it is possible.

Woolen knickers are better for mother and the girls than skirts, and of course silk stockings and high-heeled shoes are taboo in any self-respecting camp.

Select neutral colors as far as possible. The khaki color is the most serviceable in the long run, but any shades of gray, brown, or green will do very nicely.

Keep your kit simple, compact, and as light as possible. No doubt there are times when it would be nice to have a whole department store along, but in the long run it would prove very inconvenient. Be able to make a strong case for every single thing that is included, and you will need to argue the case over every time for every trip, for your exact needs will never be twice alike. One time you may be setting off on a go-light hike where *you* must carry every ounce of your own kit, and perhaps help some other fellows. Another time it may be a pack trip, and you say, "Oh, well, the animals are going to carry it." Don't be so foolish. More than once, such campers have had to lighten cargo in a tight place because of a lamed "critter," or a soaked equipment. You may even be going to ship your stuff by wagon or train. Even then, keep it down to a reasonable minimum. A few things are easier to look out for than many. Include essentials up to your weight limit, but leave non-essentials at home.

Pack your own kit. Mother is usually the official packer of

the family, and very often she has some strange and ridiculous ideas of what a boy needs in camp. I remember one boy that brought four dozen linen handkerchiefs into camp one year, packed by his mother, in case he should catch cold. It had never occurred to her that six were just as many as he could use, for handkerchiefs can be washed. When you pack your own kit, you know just what you are taking, and if you get to camp with no underwear or no nightshirt, you will then have no one to blame but your own careless self.

Study the general make-up of your pack or box (whichever the case may be), and see if you cannot improve it so as to make it more compact, easier to handle, and more convenient. I have seen hundreds of boys come into camp with every variety of baggage under the sun, from Grandma's old discarded trunk that was dug out of the attic for the occasion and was big enough for a party of six to tour the world (with probably the handles broken off so the baggage men just rolled it out like a bale of cotton, and lucky if it wasn't smashed to smithereens)—everything, I say, from old trunks to denim laundry bags or disreputable roped-up suit cases, none of which was ever meant for camping.

If you're going by wagon or train, build a light, durable, conveniently arranged wooden chest with stout rope handles, hasps, and a good lock (but don't forget the key). Plan it out so that you know what you are going to do with the space in it—blankets and clothing in the bottom, odds and ends and so forth in a light till in the top. Such a box gives you a place for your fishing-rod, tackle box, pocket ax, first-aid kit, hiking bag, canteen, kodak, individual cook kit, etc., without scattering them all over the tent.

If you are going by pack train, or are limited as to size and weight, make a strong canvas duffel bag—round in the end with a stout shirr rope. Also equip it with canvas strap handles both on the side and the end. Letter it with your

name and address. Run the pucker string or rope through a series of brass grommets well set in a double hem. Such a bag will be from fifteen to eighteen inches in diameter and from thirty to fifty inches in length.

In case you resort to a duffel bag you should make smaller bags for your other equipment—bags that will pack well inside the big bag. Usually, you can make a separate bundle of your bedding roll, strapping it well. If you must include your bedding roll inside your duffel bag, however, you must plan accordingly as to size. Do not suppose for a moment that because you have to "stuff" your equipment inside a bag, that in consequence it will be out of order and full of unsightly wrinkles. The sailor *lives* out of such a bag, but he has learned how to pack it and care for it. (See Figure 39.)

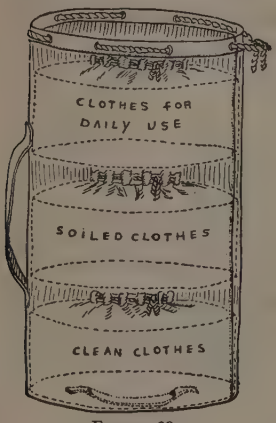


FIGURE 39

FIGURE 40

If you are going to carry your own pack by means of any one of the various more or less common shoulder pack-bags, you must further reduce your kit to absolute essentials, as there must be reserved ample room and weight for food. Probably the best pack of the kind for the average boy is that shown in Figure 40. Such a pack can easily be made from the diagram (regulating the size to your carrying ability), or purchased from any camp outfitter, canvas-goods dealer, or mail-order house. With this sort of a pack, you may either roll your

blanket and strap it on top of the pack, using a tump line to help distribute the load, or roll your blanket any fashion and sling on your shoulder with ax, canteen, kodak and the like attached at the belt. (Discussed at length in "Hikes and Hiking," on page 45.)

In any event, one must have a container, whether chest, duffel bag, or pack-sack, before one can begin to pack it. H. W. Gibson, in his "Camping for Boys," says the personal camp kit may be divided into four classes: Things necessary, things desirable, things convenient, and pure luxuries. The following list, classified in that manner, will be suggestive to you merely in helping you check up. Do not suppose for a moment that you should take any large percentage of the following duffel to any one camp. Consider each item before you select it, in the light of where you are going; how long you are going to stay; how many in the party, and with a careful knowledge of the general party equipment, if any. After you have made up your list for the special outing you are contemplating, check it again and again to be sure you have all that you must have, and that you have reduced non-essentials to the minimum.

Necessary Equipment

Bed roll, sleeping bag or empty ticking.
Blankets (all-wool, army-style preferred).
Small empty denim pillow case.
Tarpaulin or poncho.
Woolen sweater or jersey.
Flannel shirts.
Underwear, wool socks, heavy and light, or stockings.
Belt.
Outing flannel pajamas.
Bath, face and dish towels.
Camp shoes and moccasins (or sneaks for camp wear). (If ordinary shoes are worn, then include leggings.)
Handkerchiefs (colored ones preferred).
Table dishes, including knife, fork, and spoon, all with metal handle.
Toilet Articles: Soap in aluminum case, comb (brush if you desire), toothbrush in celluloid case, tooth paste, pins (safety and plain), small mirror (trench type), toilet paper, laundry soap.
Postal cards, paper, stamps, pencils, etc.
Needles, thread, buttons, and scissors.
Matches in a waterproof box.
First-aid kit and home remedies.
Folding drinking cup.
Serviceable pocketknife, with screwdriver blade.
Pocket ax, good quality, with sheath or bit guard.
Watch.
Compass.
Individual mess kit (aluminum preferred).
Bake oven.
Flash lamp or folding lantern.
Linen mounted map.
Your camp note-book of suggestions, receipts, etc.
Money in bills.
Identification card.

Also

A large package of Unselfishness, mixed well with Geniality.

Desirables

Knapsack.
Extra clothing,
Extra pair of shoes.
Soft shirts.
Bathing suit.
Athletic suit (track, baseball, etc.).
Rubber boots.
Fishing rod and tackle.
Bird or field glasses.
Camera and supplies.
Athletic goods, such as balls.
Pocket whetstone.
Pocket nature guides.
Canteen.
Bit of clothesline.
Material for entertainments, minstrel shows and the like.

Convenient

Stormy day games.
Books.
Cheesecloth or mosquito net.
Candles.
Old gloves.
Light raincoat.
Goggles.

Luxuries

Bath robe.
Laundry bag.
Mouth-organ.
Hammock.
Talking machine.
Radio.

General Suggestions

Perhaps a few suggestions relative to some of the various items of personal equipment will be helpful, especially to the beginner.

Be sure you are taking enough bedding. It is very much different, this sleeping out on Mother Nature's bosom, than even sleeping on a sleeping porch, or with all the windows up at home. Take enough blankets to be perfectly warm and comfortable. All sorts of canvas cots are likely to be cold, and you will need to tuck the blankets in well on both sides and under you. If you are to sleep on browse or leaf-filled tick, sew a piece of ordinary table oilcloth or pantisote on the bottom to keep out the dampness. Also select your mattress filling with great care, as it must go into the tick without being carefully worked together. One or two heavy limbs with sharp knots on them, and you will spend a night of misery and tell strange tales the next day of the huge "something" that insisted on prodding you in the back all night. Take time to make the best bed you possibly can. It pays.

If you are going to sleep on a browse bed, you can make an excellent tarpaulin of a long strip of eight-ounce canvas,

equipped with simple harness snaps and rings, that will prove worth the extra weight. Spread it out on your bed with a generous flap at the head for pillow purposes, then make your blankets down (if there are two of you sleeping together, so much the better, for you will have double the blankets), and snap the snaps down both sides. Such a rigging will keep you from rolling out, or kicking off your blankets, and thus lose the precious body heat; but if you use it, be careful to air it and sun it *every* day. Such beds absorb not only body moisture,

FIGURE 41

but moisture from the ground and air. Only sunshine will dry it out.

If such a "tarp" is out of the question, you can easily make quite a satisfactory bag out of your own blanket by rigging it out before you start. Take your top or outside blanket and fold it into thirds, the long way. Sew several stout pairs of tapes half way up the open side and across the end. The foot tapes should be fastened back a few inches from the edge in order to completely close the foot. Such an arrangement gives two thicknesses of the blanket over you, with the top portions left free to pull in close about you. You also have one thickness under you. It is a good idea to sew either a poncho cloth or a width of oilcloth to the third that will be at the bottom. (See Figure 41 A.) Still a simpler bag, on the same

order, may be made by tying the bottom of your blanket together with a stout cord and pinning up the open side with a half dozen horse blanket pins. (See Figure 41 B.)

Flannel shirts in camp should never be washed in hot water nor wrung out, but rather hung up wet and allowed to drip dry. This prevents shrinking. The same thing holds true with sweaters, socks, and the like. Buy only a good grade of all-wool articles. They cost twice as much as part wool and cotton, and give ten times the satisfaction. If a flannel shirt to which you are very much attached becomes burned or torn, patch the holes from a section of the tail. Don't discard the garment.

Chapters might easily be written about camp shoes, but after all the really important matters are these: don't start with new shoes on a trip where you must do much walking, no matter how soft and pliable the shoes may be. Better patch out an old pair than suffer with blisters and chafed feet every moment you are out. (Read carefully the paragraphs on the care of the feet, to be found in "Hikes and Hiking," on page 43 of this volume. Of equal importance with the above, is to avoid heavy shoes or boots. Why drag a tannery about with you when it is so unnecessary? Light-weight, tough shoes, or boots with a few hob-nails, are best for common wear. If you are going to wade streams for fish, by all means have rubber boots, or else wear old shoes that you can promptly change after you are through. Many times, beginners select big, stiff shoes for camp, because they will wear well, but this is poor economy. Think of foot-comfort first, wear afterward. For the ordinary camp, wear out your old shoes. If you are a boy, and can secure the army shoe, it is excellent. If your foot has not yet become "army size," the elk-hide outing shoes, commonly known as bicycle shoes, fill the requirements.

Be sure to have some light, soft, slip-on shoe for evenings and about the camp. Nothing rests the tired feet so much as to

bathe them, change the hose, and put on light shoes. Moccasins are the easiest to carry, and are very comfortable—not the moccasin bedroom slippers sold to tourists, but a real camp moccasin. Any camp outfitter lists them, and many large shoe stores carry them. The low slip-ons, with a heavy elk-hide sole sewed to the bottom, are excellent, and can be tucked away in any pack.

It's a good scheme to keep all extra wearing apparel in a separate bag. You always know where it is then, and it is in better shape. If your kit is to be packed in the round duffel bag, you should have three or four short round bags (each numbered or made of a different colored material) that will slip snugly inside the big bag, one on top of the other. Use one for soiled clothes, one for your ditty bag and articles used every day, and one, as suggested above, for extra clothes.

If the camp is to be a permanent camp, very likely table dishes for all will be included in the general outfit. If, on the other hand, you are to supply your own, select a medium size white enamel. Choose a flat-bottomed cup every time. Aluminumware is nice but costly, and the cups are a fine instrument upon which to burn your mouth. In addition to your table dishes, it is likely that you will have an individual mess kit. If so, and you can afford it, this should be of aluminum, and of the type now sold largely to Boy Scouts. (See Figure 42.) These are equipped with spoon, knife, fork, cup, and plate, as well as fry-pan and stew kettle, and may be made to do for table dishes very satisfactorily. In this connection, never under any circumstances put away a dirty mess kit. It is unsanitary, slovenly, and a very bad habit. Wash it as best you can, even if you must resort to grass, green leaves, or even sand to put it into shape.

FIGURE 42

In addition to your regular toilet articles, which should be of a sort that will stand considerable knocking about, you should have a small bottle of lotion for sore and chapped

hands, face, and neck, and a bottle of "skeeter chaser." Small bottles may be had at any drugstore that will just slip into a screw-top shaving stick can, and they are just large enough. There are endless varieties of both concotions, and you must discover by experience the one that will be best for you. In addition to the above, carry always on your person a tiny flat can of salve, such as mentholatum or pure home-rendered mutton tallow. This will serve no end of purposes on the long trail.

Every real woodsman or camper always carries a reserve supply of matches in a water-tight match box. The hard rubber ones are doubtless best, but a satisfactory one can easily be made from a screw-top shaving-stick can. Put a bit of blotting paper in the bottom, and put the matches in head first, run a strip of adhesive tape about the threads where the lid meets the can, and you are ready for almost any emergency. Carry one such can in your hip-pocket and another in your knapsack, for hikes, side trips, and the like. You will find a thorough discussion of ways of making fire in emergencies in "Kinds of Fires and their Uses," on page 25.

By all means, invest in a real pocketknife, not necessarily a portable machine shop, but a good quality, medium size pocketknife that will take and keep an edge. If it is equipped with a few other simple contrivances like a screwdriver, awl, can-opener, etc., very well, but do not choose it for its accessories, but for its blade and steel. It is not only unnecessary but foolish for a boy to carry any sort of a hunting knife in a scabbard attached to the belt. They are dangerous things to fall on, as well as a constant temptation to play with. Leave them home. For the man who is hunting big game they may be a stern necessity, but for ordinary camping they are a mistake. Most campers who expect to fish much will probably have a fish knife of some sort in the tackle box, and this is all the hunting knife that is needed. If you do not know how properly to sharpen a good knife, learn before you go camping,

and then equip yourself with a small, neat, pocket size, fine grindstone with which to keep your knife in shape as well as put the finishing touches on your belt ax after you have filed it into shape.

There is a great difference of opinion about the best sort of an ax. It depends so much on the type of your outing, the sort of country and the like. Unless the camp is a stationary one altogether, however, it is safe to assume that every camper will sooner or later have some sort of a belt or pocket ax in his personal kit. A few ax suggestions will not come in amiss. Buy a good ax. The cheap, commercial Scout axes are, generally speaking, practically useless. The material in them is poor. The heads, most times, are too large for either the size or length of the helve. The heads continually come off, and taken all in all, they are a nuisance. Buy only a high-class ax, and probably for boys, the all-steel ax made by the Marble Safety Ax Company is the best. It is equipped with a bit guard that conveniently folds into the handle. The handle is machine fitted and pinned with a rivet, in addition to being equipped with corrugated hard rubber plates at the butt to insure a firm grip. The light-weight or midget model is too light for real wood-cutting. Either the medium or heavy-weight will be found most satisfactory. They take a wonderful edge, and will last a lifetime if cared for. No real camper ever asks another camper for the loan of his ax. He may borrow any other thing on the trail, but a good well-kept ax, never. Such an ax in the hands of a good woodcrafter is a tool chest with which he can accomplish almost anything demanded of him in the wilderness. Practice to become expert with your ax. For other models of axes, consult a sporting-goods catalogue; also read carefully "The Ax and the Knife" on page 63 of this volume.

Of course, every camper will equip himself with some sort of a lantern or light. The modern pocket electric flash is undoubtedly the best for a personal kit, being certain that

you carry for it an extra battery and light. Some campers, especially the go-light folk, who are very liable to get into camp at dark, prefer the small carbide lamp. It gives a steady white light; it is very simple to operate, and is not expensive. If a carbide light is chosen, extra carbide should be taken in a small press lid tin that will keep it absolutely dry.

FIGURE 43

Other campers still cling to the folding Stonebridge lantern, using a tallow candle. These are very durable in the brass, and with an occasional change of the mica lights, make a convenient and satisfactory camp lantern. One should be extremely careful of any light save the flashlight in or about canvas. (See Figure 43.)

Always carry with you either in your note-book, or mounted on linen and folded to fit in your hip-pocket, a map of the surrounding country. Such maps may be secured in a variety of ways from local publishers, from automobile guides, from sporting-goods catalogues, or from the Director of the United States Geological Survey, Washington, D. C. These are the best maps for campers' use, as they show trails, rivers, bridges, mountains, elevations, settlements, and give much other important information. It may be necessary for you to get several maps and patch out one for your use, giving you the exact country you wish to travel. Such maps have brought many a lost wandering camper safe to camp, when otherwise he would not only have occasioned a fright to his fellow campers, but have found it necessary to stay alone in the woods at night.

Taken all in all, postal cards are the best for correspondence purposes, as you will find yourself too busy to write letters, unless your camp is a long-term camp. If you must carry letter paper, put it inside your camp note-book, and rub the gummed side of your stamps over your hair before putting them away, to insure them from sticking together. If on a go-light hike, drop a card home from every settlement, in

order that you may be quickly located in case it becomes necessary to reach you.

Carry your money in paper bills of small denomination, pinned in your left hip trousers pocket, or at least in a compact bill-fold. Gold coin is advocated by certain authorities, but it is so easily lost track of. By using small bills, one never has much silver change to bother with, and that is an advantage, with every pocket already full of one thing and another.

In either your bill-fold or your camp note-book, or both, you should carry a carefully filled out identification card with the usual data thereon. It is best to write this information with waterproof ink, as a good wetting is likely to wash out the ordinary kind. It might be well, while you are at it, to tuck a duplicate card in your camp chest, or sew it to the inside bottom of your duffel bag.

It is a perfectly well understood fact that if you want to really know a body, you must live with him. You cannot successfully bluff in camp. If you are selfish or underhanded, it will come out, and you will pay the penalty. If you are generous and helpful, you won't need to advertise it. If you are lazy, it won't be a day until you feel lonely and out of place. If you talk too much, or are thoughtless of others' rights and comforts, you will be unpopular. Cheerfulness is the best sort of a personal camp kit. Always come up smiling, no matter what happens to you. Smile when it rains, for it surely will; smile when the beans are burned; smile when it's your turn to bring a pail of water, or peel the spuds—or empty the garbage; smile when everything goes dead wrong—when your muscles ache; when your stomach is as empty as a dry tea-kettle. Smile—SMILE—SMILE! Tell a joke that illustrates the point; laugh at your own fool blunders; and the camp will count you the most important piece of equipment it possesses. Books might be filled with stories of camps that have been a disappointment to boys and girls because they did not know how to laugh and smile when things went wrong.

I recall a striking illustration of the value of being able to smile in hard places. We were many miles from anywhere, with a great wagon load of equipment. The hills were steep, and the roads gone as the result of heavy rains. In a deep gulch, the tired team balked—refused to pull another pound! We were miles from water, weary, dispirited, disgusted with each other and sorry we had ever come. It was then that one sturdy lad, who could laugh and smile, saved the day. He fastened a bunch of dry grass to his coat for a tail, stuck another wisp through the hole in his old bat-hat for a mane; got out the extra ropes, tied them to the wagon-tongue, rigged them with stout cross poles; "hitched" every boy in the party to the wagon, and with himself as "head-horse" turned our distress into a funny game. We laughed till we cried. We pulled till our arms and legs ached. We laughed until we got silly, but we pulled that wagon to water, camp, and fuel—all because one camper could smile. It turned out to be the best day of the trip, and a day never to be forgotten.

Study the art of living together, for it IS an art. "Think freedom and fun." Every real camper is a good companion, beloved by all because of what he *is*, not for what he *says* he is. Make full allowance, however, for those who really can't; they are still "tenderfeet."

Make your own knapsack. Army khaki is the best material. Inch and a half harness webbing for the straps. Rig it to suit your own needs. Examples in Figure 44 are suggestive. I prefer the bag that has a flat bottom, with pockets in the sides for small articles, and a good pocket in the flap for note-book and maps. Such a bag hangs well under the arms, and is

FIGURE 44

extremely roomy. Let the straps go completely around the bag. This takes the strain off the material, and makes possible a considerable load when necessary.

If you are taking a camp chest, or can make room in your duffel bag, be sure to include the volumes of NATURE AND OUTDOOR LIFE, with the possible exception of the volume entitled "Gardening: Domestic Animals." These books quite completely cover birds, mammals, insects, flowers, trees, and even the games for playtime hours. They will come in handy many times.

There is hardly a day goes by but that you want to identify some wild thing you have seen. If you can do so while the mental picture is fresh, you can locate it much more satisfactorily and remember it much better. If you are interested in some special phase of nature, make your outing an occasion to look into it more fully by personal study, observation, and investigation. Use a note-book; make sketches; put down questions that you wish to have answered when you get home. Make some real nature study a part of your outing.

In that connection, you will find a good pair of bird glasses a splendid thing; also a long bellows camera for nature's "close-ups." Such things add tremendously to the lasting value of your outing.

If the camp is a permanent one, it is likely that some time will be given in the evenings to baseball, simple track, and the like. In that event, you will need your track suit and a bit of athletic equipment. However, as a suggestion, do not overdo this phase of your kit. When you go camping—camp! You can play ball and go in for other sports all the rest of the year. Get into the woods or mountains, or onto the water, in the early evening, instead of playing ball. Get just as far away from the regular city life as possible, is the advice of the best campers.

Of course, in a large permanent camp, organized athletics have a place in developing camp spirit, if nothing else; but

even then it is so easy to overdo the thing that we already know how to do, when we should be developing new contacts that are not possible for us in the city. Take some simple athletic equipment with you, but remember, it is rarely an essential.

If you buy a canteen, be certain it is a first-class one. Aluminum is best, and choose one with a good quality of felt for the cover. Wash it out thoroughly occasionally with hot water and allow it to air. In a country where safe drinking holes are few, canteens are indispensable. Let one camper carry a canteen, another a kodak, another field glasses, and so on, so as to distribute the load, and at the same time have the advantage of these things.

If the camp is a permanent one, there will be need for stormy day games, material for amateur shows, etc. If these are not included in the general equipment, put them in yourself according to the type of stunts *you* can do. A little grease paint, a book of jokes, monologues and the like; a pamphlet of songs, a mouth-organ, jewsharp, a small flute, sleight-of-hand equipment, etc., should be considered. Make a checkerboard on oilcloth that can be rolled up, use black and white buttons for men. Include such other game material that you especially care for. If possible, it is nice to have a small model talking machine in the general equipment, each camper taking two or three records along so as to distribute the expense, as well as the load.

Finally, mark each article in your outfit either with your name or a number. Make a careful list of every article and either tack it in your chest, or paste it in your camp notebook. Check this list before leaving home for camp, and again before leaving camp for home. Get your baggage to the train early, and get it checked personally, so it will go with you on the same train. A wait at the other end for delayed equipment is always aggravating. Keep your eyes open to learn every little wrinkle you possibly can from every other

person who has thought on the problems of a personal camp kit the same as you have. Only by such procedure can you hope to eventually reduce camp outfitting to the fine science that it is.

THE BOYS MAKE CAMP

By FRANK H. CHELEY

THE train comes slowly to a stop. The gang climb off and hasten to the baggage car to see if their duffel bag has been unloaded. When it comes tumbling out, it is promptly "grabbed" and borne triumphantly to the waiting wagon, where the grub and other equipment have already been loaded. You are actually off for the chosen spot. In a brief while you will be making camp.

Of course, the spot has been carefully studied beforehand, and no doubt a rough sketch has been made of the approximate location of sleeping tents, mess tent, kitchen, flag-pole, camp fire, incinerator, latrine, and such other important camp features as need locations especially suited to them, bearing in mind sanitation as well as convenience.

If the party is to be even fair sized, and if circumstances are such that the campers cannot reach the chosen spot until late afternoon, it is always a wise thing to send a select advance squad ahead to get things in shape. Often it is good policy to get the cook shack up before the party arrives, get the water supply in first-class shape, and the latrine constructed. Perhaps there will be considerable cleaning and clearing to do, which takes time. By all means, do not make the mistake of having camp all made when the party arrives, for actually pitching camp is one of the joys that every boy should share. On the other hand, there is work of a general nature that can be done to the advantage of all concerned.

First of all, the tents are pitched, perhaps about an open square, with headquarters at one end, mess hall and cook shack at the other, with the sleeping tents on either side, army style. Or perhaps you have chosen to have them in a circle with the camp fire at the center, or possibly strung through a fringe of trees just back from high-water mark on the lake, or on a high grassy knoll overlooking the valley. In any event, pitch them well and ditch them thoroughly. Just as well do it first as last, too! Haste makes but waste, in making camp.

After the canvas is all up and well guyed, turn your attention to the beds. If they have to be assembled, get one squad busy at that while the others are ditching the tents (for likely there will not be a sufficient number of shovels to go around). If they are to be built, send one squad after poles and browse, while the others actually begin operations. Remember that the browse bed hastily made is like a suit of clothes made of shoddy; it looks all right, but it won't wear. Build a bed that you can be proud of. After you think it is all finished, put on one more layer of fine browse twigs, or dry grass, and then unroll your blankets.

With a shelter over you and a bed under you, you are ready to give the inner man a lot of consideration. Before you set up your kitchen and grub tent, ascertain if it is in a handy place, but enough in the open so that your fires will draw good. Put nails in a near-by tree for small pots and pans. Rig a shelf between two trees for convenience. Set all provisions well off the ground, and arrange them for easy reference. If you are going to use a low, sheet-iron stove, raise it on a trestle of green logs, pile of flat stones, or put it on a box upon which is first placed a six-inch layer of sod. Why break your back at the cooking, with all the building material in creation at your command? Arrange for an outside open fire as well, where the Dutch oven can be handled, or where dishwater can be conveniently heated without taking up stove room. Such a fire is a good place to start various stews,

boiled vegetables, etc. A stout pair of crotches and a cross-pole should be put up at the very beginning, and a good collection of pot-hooks of various lengths cut and placed in a handy corner.

Make cupboards of your camp chests and such grocery boxes as you can spare. If possible, string a fly over your kitchen for shade and shelter, in case of sudden storm. It is often worth while to make a cook shack of green poles and cover the roof and three sides with cheap building paper or old canvas.

When the kitchen is in apple-pie order, turn your attention to the mess tent. Take time to pitch it well, fastening the corner guys to stumps, rocks, or posts planted for the purpose. A large open fly catches in the wind readily, and is difficult to keep from "flopping" in the middle of a meal. If you can arrange to have a tree come at one end of the wedge, this will make a firm starting point.

Next build or assemble your mess table according to the type chosen. Get it level and solid. It is nothing short of a calamity to have your seat break down just when you are ready to enjoy a hearty meal. It is inconvenient, to say the least, to be compelled to prop your cup of cocoa up with a chip, or stick your fork in a crack ahead of your plate to keep it from sliding off down to your next neighbor's place. The table may be rough, but make it usable. Build it of poles nailed close together, if necessary spreading a layer of nice clean gravel over all to level it up. Use your ingenuity, and you will find no difficulty in making a satisfactory table, if you were unable to bring sufficient rough lumber for the top.

If the camp is to be large or permanent, by all means don't forget the woodpile. The cook should never have to rustle his own chips; and he needs good split wood, not just a collection of down-branches that happens to be handy. Select your stove wood in large pieces, saw and split it to

length. In no other way can a cook bake biscuits or fry flapjacks. Let there be a special pile of pine knots, or dry birch bark, for emergencies, along with a few choice heavy pieces for the Dutch oven or the dishwater.

For camp firewood, clear up the camp site. Burn all the down-stuff and low-hanging dead limbs, but don't burn it all up the first night. Let the size of your fire be determined by your fuel supply. Use great care in selecting a safe place, reasonably well protected from the wind, and where there will be no danger to the tents from sparks.

Now turn your attention to the latrine (the incinerator can well wait until the second day). Dig your pit, build your box, mount your seat board, and then pitch your latrine tent over it. Plant the saplings that are to hold the walls deep enough to hold well. Your latrine should be far enough away so as in no wise to make the camp spot unpleasant, and yet close enough to be handy. Lime it down every day, and use fresh earth generously. If it can be in a grove or a patch of tall brush, so much the better. Put the ashes from your kitchen stove or camp fire into the pit daily as a disinfectant and a deodorizer. Avoid placing the latrine so that the camp will be in line with it relative to the prevailing wind. Whenever at all possible, have the camp on the opposite side of the natural drainage ridge. In any event, satisfy yourself that your water supply is absolutely protected. Use chloride of lime generously.

While the latrine is being completed, dispatch a crew to select and bring a suitable flagpole. A hickory or lodge-pole pine sapling will be best. Trim the top smooth, attach the pulley with wire, rig your ropes, and you are ready to raise the pole. Use plenty of rock at its base, both in the ground and above the ground. If you have a suitable tree on the campus, top it and rig your pulley. Be exceedingly careful whom you allow to do this important job.

Very soon the flag is floating in the breeze, and you begin

to feel as if your wilderness home is about complete. Perhaps there is a pier to build out into the lake or river, or perhaps there is a bridge to throw across a lilting stream, or ice box to rig up in the woods, the spring to clean out and get into shape, or half a hundred other things that need attention before dark. Don't try to do them all in a day—save something for to-morrow.

The sweet smell of the wood smoke comes drifting through the trees to you. By and by it is flavored with the odor of fried bacon, and perhaps coffee. You gravitate to camp. You simply cannot help it, for you are tired and hungry. Promptly you are dispatched for a pail of water or more wood. You hardly get back until the supper signal is given, and such a joyous meal as follows! Everything is good, and everybody is happy.

When the dishes are out of the way, you slip off to look over the new country and to get the "lay" of the land; incidentally, to soak in the good forest breeze, and to commune with all outdoors for a little, for somehow you seem to instinctively realize that you have gotten back home—the place where man had his beginning; and in a strange, queer way you feel from the very start that you "belong."

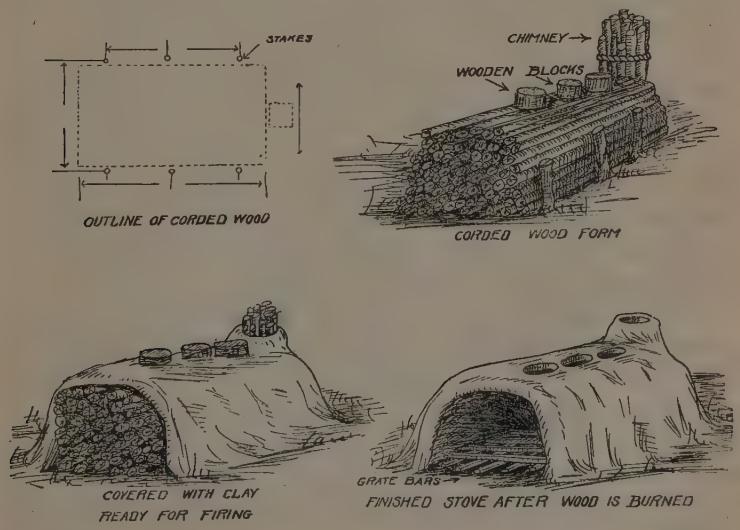
Dark is settling. The sun is just a red ball in the west. Already the myriad little peepers down in the bog are tuning up. Through the trees you see the first faint glare of the kindled camp fire, and you hasten up to join the happy gang gathered about the crackling blaze. You sing, laugh, visit, and listen to plans for the to-morrow; and then when there is nothing left but a tiny heap of glowing red embers and a circle of bright faces silhouetted against the rich moonlight glade, you slip away to your bunk, only to listen to the little stream chatter to the accompaniment of a tree-toad or a whip-poor-will. The night is alive with strange, sweet sounds. It seems your ears have suddenly become telephone receivers, for messages are coming to you from far and near. "Fattie,"

in the next tent, tells a funny story, and you smile, even if it wasn't meant for you. You are sorry for all the poor fellows who are somewhere in cities; you wonder how it came about that you were so lucky. Perhaps you hear your father, or some other boy's father who is along, warming up his "snoring apparatus," and in a few moments you slip off into the delicious land of dreams, where you have the time of your life rollicking through deep woods, swimming, fishing, hiking, living—and you're glad you came.

Other Equipment to Be Added When Convenient

A HANDY CLAY OVEN

Stoves are very difficult to transport, and as a rule are so heavy that they take up too large a part of the total possible



weight of a camp outfit. More and more, campers are leaving them behind and resorting to other means, some even falling

back on gasoline stoves or army cook kitchen equipment. Why do either one, when a very satisfactory stove may be easily built entirely of wildwood material? The clay oven pictured is not a plaything, but a practical, workable stove and oven that give excellent results. Any camper can build it if he happens to be in a country where clay is available; and wherever there are running streams there is pretty likely to be material that will do very nicely for such a purpose.

Two campers with a sharp ax and a small shovel can build such an oven in a few hours, and it will cook nicely for almost any reasonable number. Of course, the actual size of the oven will depend somewhat upon the size of a party, but one three feet long by twenty inches in width will provide ample room for any number up to twenty-five.

The construction is very simple. Study the diagram. Cut your poles, part of which ought to be green wood, stake them up, cut blocks for your openings, size to match the pots and pans of your cook kit. Make a smaller bundle of fuel for the chimney, wire it together, or tie with rope, and stand it in place. Knead up a quantity of clay or mud until it is soft and workable. Mix a small amount of hay, grass, or marsh weeds with it as binder, cover the wood well with a layer of leaves, bark, or small evergreen boughs to keep the mud from penetrating into the woodpile, and then apply the mud to a depth of six inches, working it smooth and tight.

Build a good fire against the open end and allow it to work through to the chimney. Avoid burning it too fast, as it is likely to crack. Keep a good fire going in it for several hours before you attempt to use it for cooking purposes. If you build it in the afternoon, keep a fire going all night, and the next day it will be ready for real service. Fire will burn better in it if green grate logs are used to hold the wood off the ground.

To bake in it, get it thoroughly hot, then rake the fire out, cover the pot holes with wet moss or new clay on sticks,

likewise close the chimney, then the fire opening. The tighter the oven the better the baking. Patience and a little ingenuity are the keys to success. Many campers will have no other sort of a stove.

A DIVING TOWER AND SHOOT-THE-CHUTES

By C. S. STILLMAN

Illustrations by Author

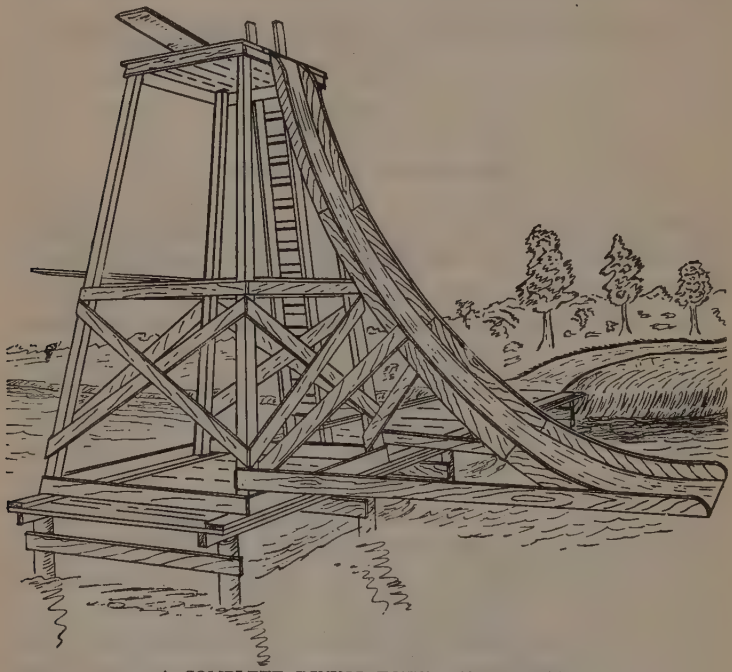
THE kind of diving tower to be built in any boys' camp depends on the surroundings and the accessibility to building material. Some boys have built very creditable towers out of saplings and spikes and seemed to have as much fun as if they were built of polished maple. However, if the material can be brought to camp the addition of a shoot-the-chutes adds very much to water sports. With the following sketches and directions any group of boys should be able to put up a solid and durable tower.

If the tower is to be located at the end of a pier where the water is deep enough for diving, get four 4 in. by 4 in. pieces of pine or fir, and with 1 in. by 6 in. lumber for braces build two side frames, according to the sketch. Set these two frames on edge and connect them with a 4-ft. board at the top and a 7-ft. board at the bottom. Then proceed to brace them as you did in the first frames at the beginning. This gives a 12-ft. frame 4 feet square at the top and 7 feet square at the bottom.

The next step is to build the ladder, and nail it to the side facing the shore; then floor the top and middle platforms with plain 1-in. boards, first putting in one or two headers to stiffen the floor. When this is done, the spring boards may be put in place as indicated, one on the middle platform, facing away from the chute and the other on the top platform facing the

deep water at the end of the pier. It is also generally advisable to make a small railing of some kind on the top, at least on one or two sides.

The only thing left is the shoot-the-chutes. This is not hard to do, but requires a little more care than the tower,

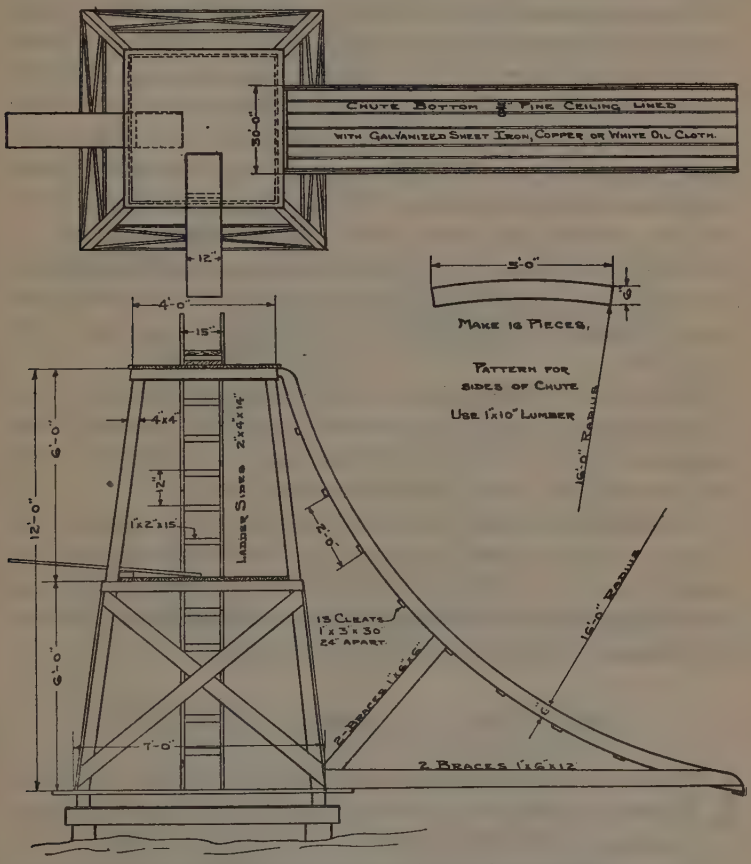


A COMPLETE DIVING TOWER AND CHUTE

The chutes may be built on the end of any pier, taking advantage of both deep and shallow water

because you are dealing in curves. When the lumber is ordered for the tower the dealer should be furnished with a pattern, as shown in the sketch. He can then very easily get out the 16 pieces required for the curved sides of the chute. If there is no band-saw in the community it will be up to the boys to rip them out of 10-in. lumber with a rip-saw which

has plenty of set in it. There is not enough curvature to the sides to make the work very difficult. When the 16 pieces have been secured, cut 2 of them in two at the center. Lay



BOYS' DIVING TOWER AND SHOOT-THE-CHUTES

the half-piece on a whole piece with the ends flush at one end, and nail them together. If the inside curve of the segments is reasonably true you can then simply add 1 piece and then another until the 8 pieces, including 2 half-pieces, are doubled

together, each piece overlying one half of 2 others, like the bricks in a wall. The other side of the chute will, of course, be made the same way.

When the sides of the chute are ready they should be nailed the proper distance apart by 13 cleats 1 in. thick, 3 in. wide and 30 in. long, placed 2 feet apart on the convex or bottom edge of the chute sides. This makes the framework of the chute. Next take 5/8-in. ceiling, and floor the inside of the chute just as if it were a flat floor, except that you will have to press down the boards to make it follow the curve of the sides. This can then be lined with white oilcloth or sheet metal. If desirable, the ceiling can be omitted and 30-in. galvanized iron screwed on to the bottom of the curved rails, or the metal may be nailed on and the cleats put on for extra support and strength.

The chute may then be put in place by nailing one end to the middle of the cross piece at the top of the tower and then nailing on the 12-ft. brace at the bottom. The 6-ft. braces at the center of the chute should then be added.

If it should be desired to set the tower on the bottom of the stream or lake, instead of the pier, it can easily be done by using 16 or 18 ft. corner timbers, letting the extra length run below the part indicated in the sketch, and building a crib at the bottom to hold the stones for anchorage.

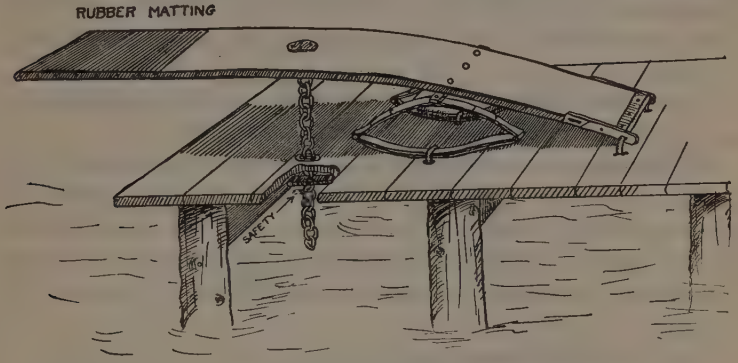
BUILDING A SPRING-BOARD

BUILDING a spring-board on the end of a pier at camp is always a problem, for the constant vibration occasioned by jumping on the plank either rocks the pier so it is not safe, or soon settles the end posts so that the plank dips too sharply to the water and is dangerous.

If the camp is to be of any duration, far better make a good, detachable spring-board at home and ship it. The sketch will suggest many desirable features for such a board. The board

itself should be of seasoned hard wood, at least 2 in. thick and 14 in. wide. It should be well painted with pure white lead and oil to keep the water out. The springs are ordinary buggy or light wagon springs and may be secured at a blacksmith shop or junk yard. Such springs give each boy just the lift he needs according to his weight. This overcomes the difficulty of having the plank too soft for some and too stiff for others.

The chain safety is necessary to keep the rebound from breaking the springs. It may easily be adjusted to any spring



A SPRING-BOARD

by putting a bolt through the proper link under the platform. If the board proves to be limber, chain it down a few links tighter.

The spring itself may be securely fastened to the pier by means of old spring shackles on either side where the board should be used with these to relieve the strain; also where the butt-end is bolted to the pier.

The rubber matting on the far end is merely a safety to prevent dangerous slips. An old piece of carpet, canvas, or burlap sacking will do quite as well. It will always be desirable to have a pair of stout supports for the pier directly under the springs. This will tend to reduce the give in the pier to a minimum.

A WORD ABOUT CLOSING CAMP

By FRANK H. CHELEY

BUT there still remains an important feature; to slight it, means to acknowledge to next year's campers that you were a tenderfoot after all, reports to the contrary notwithstanding.

It is quite as important to break camp in a thorough manner as to make it. Here are a few hints to that end.

Repair all canvas before putting away for the winter. Put on new guy ropes where necessary. Be sure your canvas is thoroughly dry, well folded, and protected in either old canvas, burlap bags, or grain sacks, each sack tagged with good tag, giving size, condition, and general memoranda concerning the bundle.

Pull all nails, hooks, etc., from each pole (if you have any) and tie poles in bundles with a tag.

Give all tin kitchen equipment a coat of grease to keep it from rusting. Empty all salt, pepper and the like. Invoice the contents of each chest, and tack invoice on the outside, making copy for your loose-leaf camp book. Clean the ashes thoroughly out of your stove and pipes, and tighten up loose bolts, nuts, and screws.

Give your toilet seat a good coat of linseed oil or paint.

Repair and paint your boats or canoes.

Make a list now, while things are fresh in your mind, of articles that need replacing; also add to your list items of equipment that should be gotten before another season. Discard wornout and useless equipment.

Clean the camp grounds up thoroughly. Gipsies and tramps

leave a trail of tin cans, litter, old browse beds and the like behind them, but good campers never do. Burn everything that will burn—bury the rest. You may wish to return yourself; if not, some other party may choose to use your site. Pay your bills and thank all those who have contributed to make your outing a success. Incidentally, government rangers, as well as settlers, appreciate this last point. Earn for yourself and comrades the reputation of being thoughtful, reliable, and courteous.

When you reach home, carefully overhaul your own duffel, putting it in shape as far as possible. Also give your camp note-book the "once over" with an eye to checking up and improving it for future use.

Then, and not until then, can you consider your camp another completed chapter in your life.

COOKING IN CAMP *

By F. K. BERRY

YOU may sing of the incense of roses in June,
Or the perfume from orchards in May,
The sweet-smelling odors that come from the loft
That's filled with the new clover hay;
But I recall one that is sweeter by far
Than the nectar from rose, tree, or clover,
'Tis the smell of the bacon that's cooking in camp—
Makes you wish you could live life all over.

You remember the trout in the pool, just below
Where a rock, jutting out from the shore,
Makes a good place to stand as you whip out your flies,
And capture two good ones or more.

* Reprinted from *Outing*, by permission.

Then after a day filled with pleasure and work,
As you trudge back to camp with your trout,
The smell of the bacon that's cooking up there
Is the sweetest of odors, no doubt.

And after the supper has been stowed away
In the place where it does the most good,
And the camp fires are burning, the pipes are lit up,
And the stories come forth as they should.
The night winds are sighing through pine tops above,
The stream is a-babbling out there;
The note of the whip-poor-will, plaintive with love,
Is borne on the night's balmy air.

You may sing of the incense of roses in June,
Or the perfume from orchards in May,
The sweet-smelling odors that come from the loft
That's filled with the new clover hay;
But the one that comes to me on the night breeze,
Before with sleep I'm o'ertaken,
Is the odor of needles from off the pine trees,
Blended in with that of the bacon!

We get three sorts and periods of enjoyment out of a hunting trip. The first is when the plans are being discussed and the outfit assembled; this is the pleasure of anticipation. The second is the enjoyment of the actual trip itself; and the third is the pleasure of retrospection when we sit round a blazing wood-fire and talk over the incidents and adventures of the trip. There is no general rule to know which of the three gives the keenest joy. I can think of a different expedition in which each sort stands out in pre-eminence.—KERMIT ROOSEVELT.

CAMP COOKERY*

By AVA B. MILAM
Dean of the School of Home Economics, Oregon Agricultural College

A. GRACE JOHNSON
Assistant Professor of Home Economics, Oregon Agricultural College

AND

RUTH McNARY SMITH
Formerly Instructor in Home Economics, Oregon Agricultural College
Now Instructor in Home Economics, Iowa State College

Proper Diet in Camp

IN NO place is it as difficult to provide a proper diet as in camps, where only limited supplies can be taken. The three chief items of food in the average camp are bacon, dried beans, and rice. These foods, plus some dried fruit, a quick bread, and a beverage, such as cocoa, coffee, or tea, form a fairly well-balanced ration. Some variety may be obtained by replacing the bacon and beans with cheese, nuts, ham, game, or fish, the last two to be procured while in camp.

Since fresh vegetables are so very important in the diet, and are so difficult to carry, except at the start, the camper should avail himself of water cress, yellow dock, lamb's quarters, pepper-grass, mustard, miner's lettuce, dandelions, and any other edible plants which are to be found in the vicinity of the camp. All of these are cooked as greens with the exception of the water cress. This, as well as sorrel, may be eaten raw,

* Printed by special arrangement with the authors.

often serving as a good filling for sandwiches when there is not time to cook a meal. It is also very good eaten with bacon between cold biscuits.

During the seasons of the year when these edible plants cannot be obtained, mineral salts are supplied by the use of dried vegetables. Desiccated onions, potatoes, carrots, turnips, and corn can take the place of fresh vegetables. Dried spinach is an invaluable addition to the diet, and should be used more liberally. Hard crackers and hard tack may often be a good substitute for the hot breads that are so common in camp.

Fruit in some form is an absolute necessity in the camper's diet, not only because of its mineral content, but also because of its bulk. There is of necessity a tendency to use foods of great concentration. The faults of such a diet may also be overcome to a great extent by the use of bran breads and more dried fruits and vegetables. It is also wise to derive more energy from cereals instead of so much from sugar and fat; indeed, much of the digestive trouble of campers is due to the large amount of fat used.

No matter what food is being purchased for use in camp, it is always economy to buy the very best grade on the market.

Food Supplies for the Camp

Transportation facilities govern very largely the quantity and kind of supplies which may be carried on any camping expedition. There are certain staple food materials, such as flour and beans, which are common to all camps; there are the desirable but bulky articles such as canned vegetables; and the often impossible luxuries such as eggs and cream. The forest ranger with a pack-horse, the four-man hunting party, and the large lumber camp, all have different food problems; but there are several things to be considered in buying supplies for any of these. A food to be useful for camp and trail must contain the maximum amount of nutriment, or food value, with a

Courtesy of M. D. Crackel

AMATEUR COOKS

Photo by Edwin Levick, New York

A MILLION DOLLAR KITCHEN FOR A DOLLAR AND A HALF

minimum of bulk. Although these conditions limit the available food materials somewhat, it is possible to have more palatable and nourishing food, and also more variety than is usual in camp fare. A judicious choosing of 100 pounds of supplies will result in a variety which will add much to the health and comfort of the woodsman.

Ration List

A ration is the food estimated to be necessary for one man one day. The amount of various articles in the following ration are designed to be sufficiently liberal for all circumstances.

Article	Unit	100 Rations
Fresh meat, including fish and poultry (a)	Pounds	100
Cured meat, canned meat, or cheese (b)	Pounds	50
Lard	Pounds	15
Flour, bread or crackers	Pounds	80
Corn meal, cereals, macaroni, sago, cornstarch	Pounds	15
Baking powder or yeast cakes	Pounds	5
Sugar (syrup or strained honey)	Pounds	40
Molasses	Gallons	1
Coffee	Pounds	12
Tea, chocolate, or cocoa	Pounds	2
Milk, condensed (c)	Cans	20 or 40
Butter	Pounds	10
Dried fruit (d)	Pounds	20
Rice and beans	Pounds	20
Potatoes or other fresh vegetables (e)	Pounds	100
Canned vegetables or fruit	Cans	30
Salt	Pounds	4
Spices	Ounces	4
Flavoring extracts	Ounces	4
Pepper or mustard	Ounces	8
Pickles	Quarts	3
Vinegar	Quarts	1
Soap		
Matches		

On the basis of this list, a party of six will consume 6 rations a day; 100 rations will therefore last 17 days. The cost of the above rations will vary, necessarily, with the locality. Where transportation is difficult, as by pack animals, the above list must be varied by omitting the heavier provisions. This includes those containing the most moisture, such as all canned fruits and vegetables. These may be replaced by dried fruits and vegetables. Where fresh meat cannot be obtained, it must be replaced by additional bacon, ham, and corned beef.

Where provisions must be carried on campers' backs, a still further cut must be made in the heavier articles. Under the most favorable conditions sufficient flour, bacon, rice, beans, oatmeal, corn meal, tea, sugar, dried fruit, and salt should be provided.

One Month's Supplies for One Camper on a Forest Trip

24 lbs. flour (includes flour, pancake flour, corn meal in proportion to suit)
20 lbs. meat (bacon or boned ham)
6 lbs. rice
½ lb. baking powder
3 lbs. coffee
1 lb. tea
12 lbs. sugar
8 lbs. cereal
1 lb. raisins
5 lbs. beans
3 lbs. or ½ dozen erbswurst or powdered soups.
1 lb. dried carrots
1 lb. dried onions
2 lbs. dried potatoes
*1 can dried eggs
Salt and pepper
5 pint cans of condensed milk

* Not necessary.

One Month's Supplies for One Camper on Pack-Horse Trip

24 lbs. flour supplies (flour, flapjack flour, or corn meal)
20 lbs. ham and bacon
2 lbs. hominy
6 lbs. rice
3 lbs. coffee
1 lb. tea
20 lbs. potatoes
1 lb. dried onions
12 lbs. sugar
3 lb.-pail lard
3 lbs. rolled oats
5 lbs. mixed dried fruit (apricots, peaches, and prunes)
Salt, pepper, cinnamon
5 pint cans of condensed milk
5 lbs. beans
½ gallon heavy sirup
5 lbs. navy and brown beans
*1 can dried eggs
2 lbs. dried corn
1 lb. dried carrots
1 lb. dried onions
1 lb. raisins

The use of saccharine tablets is recommended by some campers because of the advantage in lightening a load. Such writers do not, however, seem to take into consideration the fact that, excluding fat, sugar is the most concentrated food that can be carried. One saccharine tablet may represent the sweetening power of one teaspoon of sugar, but it does not represent its food value.

(*a*) Eggs may be substituted for fresh meat at the ratio of 8 eggs to 1 pound of meat. There are dried eggs on the market which are considered very satisfactory substitutes for fresh eggs. There are some egg substitutes, however, which are by no means a good substitute for fresh eggs.

(*b*) Fresh meats and cured meats may be interchanged on the basis of 5 pounds of fresh for 2 pounds of cured.

* Not necessary.

(*c*) Fresh milk may be substituted for condensed milk in the ratio of 3 pints of fresh for 1 pint of condensed. Powdered milk of a good quality may be used in place of condensed milk (1 pound of powdered milk to 9 pints of water). Condensed milk should be carefully sealed by the use of small disks of paper placed over the holes.

(*d*) Fresh fruit may be substituted for dried fruit in the ratio of 5 pounds of fresh for 1 pound dried. The dried cranberries and rhubarb make good sauces and are craved by most campers. Raisins, dried figs, dried prunes, and dried apples are excellent for camp use.

(*e*) Dried vegetables may be substituted for fresh vegetables in the ratio of 1 pound of dried for 3 pounds of fresh. Most of the desiccated vegetables on the market are of good quality. It pays to purchase the best grade. Spinach, peas, carrots, onions, potatoes, corn, squash, beets, and string beans are excellent.

Suggestions

Corn meal is a good substitute for a part of the white flour in corn bread, johnny-cake, etc., giving that change in diet which is an important factor to be considered.

The coarse sort of hominy makes a good variety.

Rice is a very desirable camp food. It weighs little in proportion to its bulk, and one-half cup is ample for four persons for one meal. It contains much nutriment, and one does not easily tire of it. It may be served in many ways: boiled; boiled with raisins; boiled, then fried; made into baked puddings; cooked with cheese; and made into cakes.

Macaroni is bulky, but a small package goes a long way and is both palatable and nutritious. It may be obtained in small pieces an inch or two long, and in this form can be easily packed.

Peanut butter is a very acceptable substitute for butter, having the advantage of being more easily handled, and not becoming rancid so rapidly.

With the increase in the cost of meats, nuts are coming into greater use as "meat substitutes." The partial substitution of nuts in place of meat in the diet is economy.

One pound of English walnuts costs 40 cents and gives 859 calories
One pound of peanut butter costs 30 cents and gives 2741 calories
One pound of round steak costs 50 cents and gives 652 calories

Note: The above are average prices under normal conditions.

As shown by these figures, beef round costs over five times as much as peanut butter when considered in terms of energy. This indicates the concentration of nuts as compared with meat. They should therefore be included in the ration lists for campers.

Lard or its substitutes may be used. Butter is a luxury not usually carried on long trips. However, many campers find it possible always to have fresh butter by carrying it in a pail, and at each stop placing this pail in a stream where it is kept perfectly cold. Butter put out in two-pound, hermetically sealed packages has been carried and used after a period of three months.

Raisins and dried fruit, including figs, should be on every provision list, while sweet chocolate (used extensively in the army) is a desirable accessory to camp fare because of its concentration.

One consumes much sugar when out in the open. It is a quick and comparatively cheap source of energy. It is also very concentrated, one pound of sugar containing much food value. One need not try to find a more concentrated substitute. Sirup is good on flapjacks and bread, and should always be in camp in some form.

Beans are rich in sustenance, light in weight, and compressed in bulk. They are not easily cooked at a high altitude. Lima beans are the easiest cooked. A few brown beans may be added for variety.

Even though canned tomatoes have small food value, and

mean much added weight, it is wise to carry them into summer camps or in arid regions. They are most refreshing at the end of a long hard day, and are valuable for their mineral content.

Tea or coffee may be taken. There are brands of coffee-extract now on the market which are easily made, and seem to be liked by many people. These preparations are usually a very fine powder, put up in convenient tin boxes. One-half teaspoonful is placed in a cup, boiling water is poured on, and the coffee is made. Cereal coffee is preferred by some, and is prepared with the same ease.

A few ounces of cinnamon, allspice, nutmeg, ginger, cloves, and other spices can be easily taken; they help to make desserts possible, and some of them may also be used in the curing of meats.

The most practical towels to carry are those made from house-lining muslin. They have the advantage of absorbing water readily even when new.

SUGGESTIVE TABLE OF SUSTENANCE PREPARED BY U. S. FOREST SERVICE

(Food required for 1, 2, 4, 6, 8 and 10 men per day)

Article	Number of Men					
	1	2	4	6	8	10
Flour, pounds	1.00	2.00	4.00	6.00	8.00	10.00
Corn meal, pounds	.05	.10	.20	.30	.40	.50
Breakfast foods, pounds	.10	.20	.40	.60	.80	1.00
Rice, pounds	.05	.10	.20	.30	.40	.50
Crackers, pounds	.05	.10	.20	.30	.40	.50
Potatoes, pounds	.90	1.80	3.60	5.40	7.20	9.00
Sugar, pounds	.40	.80	1.60	2.40	3.20	4.00
Coffee, pounds	.12	.24	.48	.72	.96	1.20
Butter, pounds	.10	.20	.40	.60	.80	1.00
Cured meats, pounds	.50	1.00	2.00	3.00	4.00	5.00
Fresh meat or fish, pounds	.25	.50	1.00	1.50	2.00	2.50

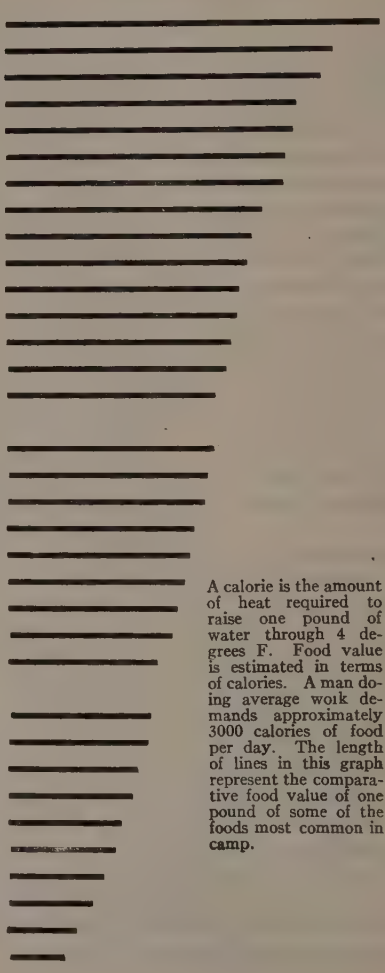
SUGGESTIVE TABLE OF SUSTENANCE—*Continued*

(Food required for 1, 2, 4, 6, 8 and 10 men per day)

Article	Number of Men					
	1	2	4	6	8	10
Tea, pounds	.01	.02	.04	.06	.08	.10
Lard, pounds	.15	.30	.60	.90	1.20	1.50
Vegetables, pounds	.10	.20	.40	.60	.80	1.00
Onions, pounds	.10	.20	.40	.60	.80	1.00
Beans, pounds	.15	.30	.60	.90	1.20	1.50
Chocolate, pounds	.02	.04	.08	.12	.16	.20
Baking powder, pounds	.02	.04	.08	.12	.16	.20
Soda, pounds	.01	.02	.04	.06	.08	.10
Salt, pounds	.04	.08	.16	.24	.32	.40
Macaroni, pounds	.02	.04	.08	.12	.16	.20
Cheese, pounds	.10	.20	.40	.60	.80	1.00
Pepper, pounds	.01	.02	.04	.06	.08	.10
Cornstarch and tapioca, pounds	.05	.10	.20	.30	.40	.50
Spices, pounds	.05	.10	.20	.30	.40	.50
Fruit, dried	.15	.30	.60	.90	1.20	1.50
Meat, canned	.05	.10	.20	.30	.40	.50
Vegetables, canned	.10	.20	.40	.60	.80	1.00
Tomatoes, canned	.10	.20	.40	.60	.80	1.00
Corn, canned	.10	.20	.40	.60	.80	1.00
Fruit, canned	.15	.30	.60	.90	1.20	1.50
Milk, canned	.10	.20	.40	.60	.80	1.00
Pickles, canned	.03	.06	.12	.18	.24	.30
Extract, pints	.04	.08	.16	.24	.32	.40
Catsup, bottles	.02	.04	.08	.12	.16	.20
Soap, bars	.05	.10	.20	.30	.40	.50
Matches, boxes	.01	.02	.04	.06	.08	.10
Lemons, dozen	.01	.02	.04	.06	.08	.10
Candles, dozen	.05	.10	.20	.30	.40	.50
Eggs, dozen	.10	.20	.40	.60	.80	1.00
Coal oil, gallon	.01	.02	.04	.06	.08	.10
Pancake flour, pounds	.06	.12	.24	.36	.48	.60
Sago, pounds	.02	.04	.08	.12	.16	.20

This table is EXTREMELY liberal. The quantity of salt specified appears insufficient; of spices excessive.

FOOD VALUE OF ONE POUND OF COMMON FOOD MATERIALS


Article
Lb.
Comparative Food Value
Calories
LARD 1 4082
BUTTER 1 3488
WALNUTS hulled 1 3199
CHOCOLATE 1 2772
PEANUT BUTTER 1 2741
BACON 1 2597
PEANUTS hulled 1 2487
CHEESE 1 2079
SUGAR 1 1814
ROLLED OATS 1 1803
MACARONI 1 1624
CORN MEAL 1 1613
FLOUR 1 1603
RICE 1 1591
BEANS 1 1564
MILK condensed sweetened 1 1480
DATES 1 1416
RAISINS 1 1403
APPLES DRIED 1 1318
MOLASSES 1 1301
APRICOTS 1 1260
BREAD 1 1174
PRUNES 1 1116
BEEF DRIED 1 760
MILK condensed unsweetened 1 757
EGGS FRESH 1 595
CORN CANNED 1 445
MILK WHOLE 1 314
POTATOES fresh 1 304
PEAS canned, 1 251
APPLES 1 214
ORANGES 1 169
TOMATOES canned 1 103
CABBAGE 1 100
A calorie is the amount of heat required to raise one pound of water through 4 degrees F. Food value is estimated in terms of calories. A man doing average work demands approximately 3000 calories of food per day. The length of lines in this graph represent the comparative food value of one pound of some of the foods most common in camp.

Camp Equipment

For a party of six, where transportation is by wagon, the following are the essentials of the living equipment for the camp—that is, the equipment exclusive of that required for transportation.

3 (7 by 9) tents (2 for sleeping, 1 for storage and cooking)
45 feet of ¼-inch rope
In winter 3 heating stoves, also 1 small (sheet iron) wood cooking stove, with pipes
2 mess boxes, one for cooking utensils, the other for tableware and light provisions, made of pine or cedar, screwed together, with hinged tops and compartments; also an inside cover, the full width of the top, which may be used as a bread board. When the lids are opened out and the two mess chests placed together they form a table of the width of the mess chests placed together and a length four times their thickness. These chests should be 2 feet deep, 20 inches wide, and 24 to 30 inches long, so as just to fill a wagon bed

The above chests, although desirable, are by no means indispensable, for the resourceful camper can improvise similar conveniences with the available materials and tools at hand.

Mess kit may consist of the following articles:

2 pepper and salt boxes (aluminum ware)
2 buckets (collapsible canvas)
6 cups (enameled)
1 bread pan (tin)
2 frying pans
2 two-quart nesting stew pans (enameled ware)
1 half-gallon coffee pot (enameled ware, with wire bail handle)
1 tin measuring cup or ½ pint tin cup for measuring
4 enameled camp kettles with covers, size ranging from one to three gallons, so as to nest one within the other
6 bowls for soup, oatmeal, etc. (enameled)
1 Dutch oven
1 dishpan (heavy tin)
10 plates (enameled)
1 quart cup (tin)
2 large sharp knives

1 butcher knife
½ dozen steel black-handled knives and forks
½ dozen plated tablespoons
1 cooking fork (12 inches long)
Few feet of baling wire (about 15 gauge)
Pair of pliers (side cutting)
1 dozen plated teaspoons
1 kerosene oil can
White oilcloth (for table)
Towels
1 wash basin (enameled ware)

Where camp equipment is transported on the backs of animals, aluminum and tin should be substituted for enameled ware in order to reduce the weight, and many of the above articles must be dispensed with. The stoves for baking will be replaced by a tin or aluminum reflector or Dutch oven. The aluminum reflector is more easily kept bright than the tin, thus enabling it to reflect heat more effectively. When not in use, the reflector folds to an inch in thickness and about twelve inches by eighteen inches in dimension. It weighs only about two or three pounds, and costs from two to four dollars.

Reflector

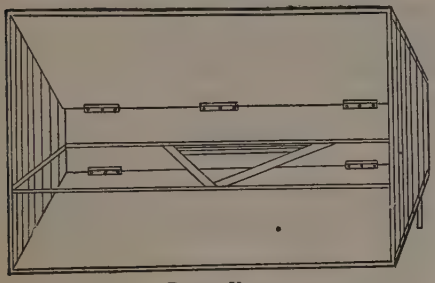
In place of a reflector a Dutch oven may be used; a device, however, which has several undesirable characteristics. It is shaped like a high and heavy iron kettle on short legs, and is provided with a massive sunken cover. It is not only heavy to carry, but is awkward to pack; but for long slow cooking it is excellent.

For transportation on men's backs, practically everything must be dispensed with but a few tin or aluminum plates, cups, knives, forks, spoons, nesting pails, frying pan, and stew pan.

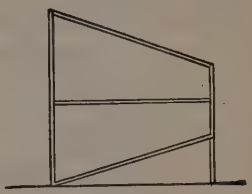
All of these articles may be found in the aluminum camp kits, which are light, compact, and complete, and which nest in a very small place.

Cooking Fire for a Small Camp

There are many ways of building the cooking fire. The essential in each case, however, is a good permanent draft. For frying, making coffee, and similar cooking operations the fire should be small but hot. The wood used should be of dry

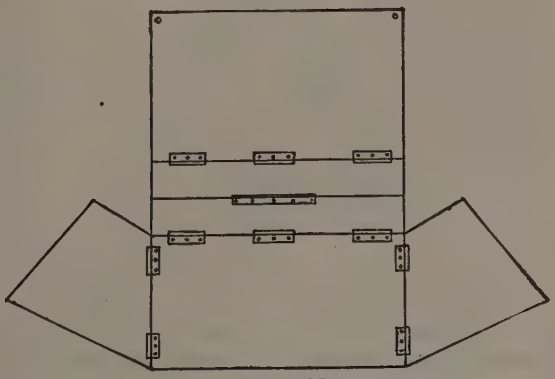


Front View



End View

Plan



REFLECTOR

Oven can be folded together when not in use.

hardwood sticks, an inch or less in diameter and about a foot long. First build a fire of these and let it burn down to form a bed of coals. Have a supply of the smaller sticks ready, so that if the fire dies down too much it may be replenished. With this sort of a fire, the heat is *under* the utensils, and it is not necessary to tie a pole to the frying pan handle as is usually

the case when frying over a fire made with large, long sticks of wood.

A draft is secured by the method usually employed in sheep camps. The site is chosen and an excavation is made, removing the soil to a depth of twelve inches or about the depth of the shovel. The hole thus made should be approximately three to four feet long and fifteen to twenty-four inches in width. The side exposed to the prevailing wind is then shov-

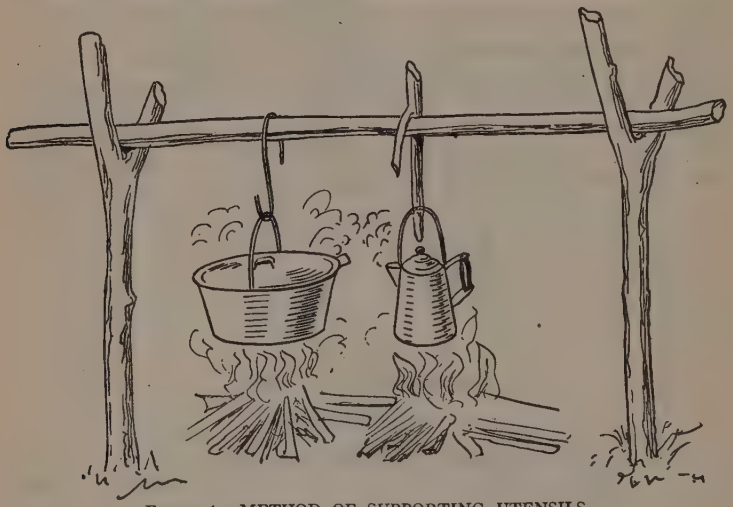


FIGURE 1.—METHOD OF SUPPORTING UTENSILS

eled away, allowing the free entrance of air. This opening is the front of the cooking fire. The air going in passes along the side walls to the rear and thence upward, thus completing the draft. Select two green poles of sufficient length to extend over the ends of the hole (four to six inches in diameter), one to serve as a back log, the other as a front log. Lay the poles over the hole, spacing them the proper distance to support a camp kettle, frying-pan, or coffee pot. Kindle the fire beneath and proceed with the cooking. The poles can be replaced from day to day as they burn away. When cooking

frying-pan bread by reflected heat, usually a dry front pole is preferred to a green, because the dryer pole, being somewhat charred, combines with the hot coals beneath to produce a greater amount of reflected heat.

Methods of Supporting Cooking Utensils

The pole from which kettles or meats are hung is usually known as a crane. This crane is made from small tough limbs of trees. Any one of the styles shown in Figures 1, 2, and 3 may be used successfully. The pot-hooks are made from

Figure 2

saplings or number 9 wire, as shown in Figures 5 and 6. The use of these hooks often prevents burning of the hands when handling kettles. If hooks of different lengths are made the desired intensity of heat can easily be secured by regulating carefully the distance of the kettle from the fire. Figure 2 shows a crane especially well suited to the roasting of a bird or other meat. For such purposes the pole is much longer, and from the upper end a long wire is hung. The bird is then securely fastened to the lower end of this wire, where it is allowed to swing during the roasting process. Figure 4 shows a cooking fire often used in temporary camps. The large green logs are placed farther apart at one end than the other,

thus giving support to kettles of different sizes as well as aiding in giving the fire a better draft. The same results may be obtained by using stones in place of green logs, thus saving time as well as reducing the danger from fire when breaking camp.

Making a Fireless Cooker in Camp

It is a very simple matter to construct a fireless cooker in camp if one has given it some thought before starting, and supplied oneself with enough material to make the cooker.

Figure 3

This material need not be "excess baggage," but may be utilized in constructing the pack for the trip.

It is best to construct a box about the same size and shape as the box used in shipping two five-gallon cans of oil. These pack readily on a mule, and hold a surprising amount of camp material. The material, to be at its best, should be about one inch thick for the end pieces and three-quarter inch thick for the sides, bottom, and cover. Such thickness will stand more pressure in packing. If this is impossible, use a plain oil packing box.

Obtain a sufficient supply of excelsior, pulverized cork,

paper, or other insulating material to fill the box heaping full. This material may be used in the packing.

In constructing the cooker, see that the sides and bottom of the box are solid; it may be necessary to add more nails. See that all cracks have a strip nailed over them; and in general make the box as nearly air-tight as possible.

Place pasteboard, if available, around the inside of the box and on the bottom. The large pasteboard from a wholesale

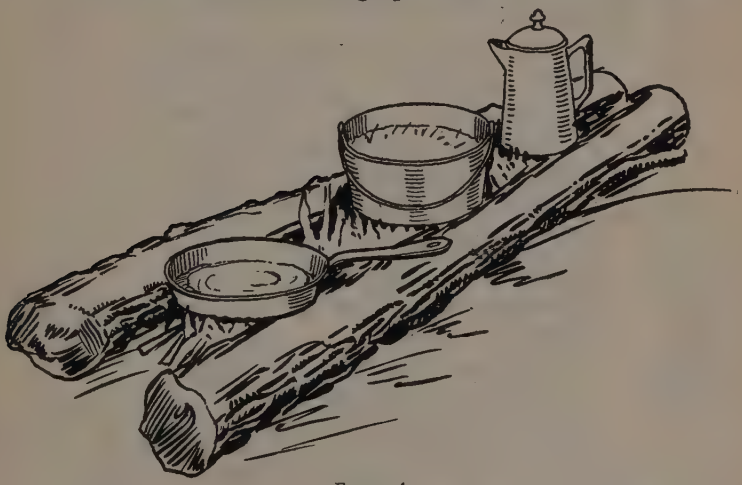


FIGURE 4

cereal package is best. Then pack insulating material into the bottom of the box. Place the vessel to be used in the center of the box and pack this material firmly around it. Any air-tight vessel may be used. Aluminum is best, for it heats up quicker and maintains a more even heat for a longer period. Regular fireless cooker vessels, having clamped lids, may be purchased.

After packing the excelsior or other material around the vessel, remove the vessel and line the opening with pasteboard, to aid in maintaining heat and in keeping the wall from breaking down.

A layer of pasteboard may also be placed over the entire

top of the insulating material, leaving a hole to match that in this material. In constructing the lid, cleats about three-quarter inch thick and two and one-half to three inches wide should be nailed along the edges, both at the ends and sides. These are made to fit down closely around the sides and ends of the box when closed, thus conserving all the heat possible.

FIGURE 5

A heavy cloth cushion filled with excelsior or cork should be provided. This must be full enough to make it difficult to shut the lid, thus assuring an air-tight vessel. Hinges and a hook may be used, or a heavy leather strap may be cut into hinges and a large bowlder used to hold the lid down tight.

A fireless cooker is a great convenience, making it possible to cook cereal over night, and other foods such as beans, during the day, thus giving a well-cooked product.

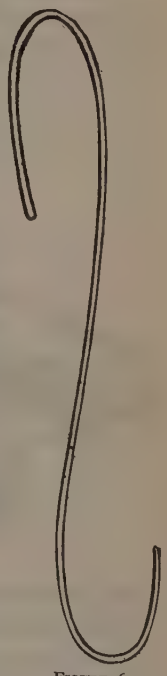


FIGURE 6

In order to cook any food in a fireless cooker, first cook until heated through in the cooker kettle, cover and place in the cooker while it is still very hot. A hot soapstone disk, flat stone, or stove lid will make the cooking more rapid. The food may need to be reheated before serving.

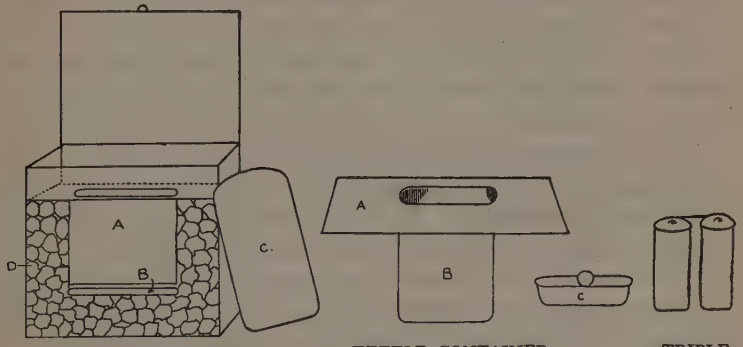
WHAT THE DAY'S FOOD SHOULD SUPPLY *

The accompanying meals would supply the following substances in about the right proportions to keep the camper in

* Quoted parts of this section are from Farmers' Bulletin 808.

healthful condition and to make the food taste good, providing they were well prepared.

"(*a*) Mineral substances of great variety (lime salts, compounds of phosphorus, iron, and others). These are used by the body for building material, and are found in all parts of it. They also produce substances within the body tissues which tend to offset acid substances produced in the tissues in the course of digestion of meats and cereals and serve many



FIRELESS COOKER

A = Kettles
B = Soapstone or Lid
C = Pillow to cover kettle container
D = Insulating material

KETTLE CONTAINER

A = Metal rim
B = Container
C = Cover

TRIPLE KETTLES

other important uses. Without fruits and vegetables the meals would be likely to lack certain mineral substances. Without milk they would be lacking in a mineral substance specially needed by children; that is, lime.

"(*b*) Protein. Protein serves as fuel for the body and also provides a certain important element—nitrogen—which is needed in the case of children for growth, and in the case of both children and grown people to keep the body in repair. Without the meat or meat substitutes (including milk) the meals would be lacking in this body-building material.

"(*c*) Starch. This is one of the chief fuels of the body and is supplied mainly by the cereal foods.

"(*d*) Sugar. This serves as fuel for the body and to flavor the food. It is found in milk, fresh fruits, and many other foods; but unless small amounts of very sweet substances—sugar itself, sirup, or honey—are used, the diet is likely to be lacking in it.

"(*e*) Fat. This serves as body fuel, and also improves the flavor and texture of the food. It is present in meats, nuts, and many other foods, but unless small amounts of specially fat materials, like butter, oil, or cream, are used, the meals are likely to be lacking in it. Moreover, dishes cooked without a certain amount of fat, and meals served without butter or some substitute seem, to most persons, dry and unpalatable.

"(*f*) Cellulose. This is the material which makes up the framework of plants. It gives bulk to the diet and may tend to prevent constipation. Without the fruits and vegetables the meals would be lacking in this important element.

"(*g*) Certain newly discovered substances in very small amounts, which are believed to play an important part in keeping people well and in promoting the growth of children. Without milk in the diet some of these substances, particularly those necessary for children, would be lacking, and without meat, milk, eggs, fruits, and vegetables, others needed by persons of all ages might not be present in sufficient amounts.

"(*h*) Flavorings and condiments. In most families some materials are used in preparing or serving food which add to the attractiveness of the meals without furnishing the body any nourishment. Among these are salt, pepper, vinegar, lemon juice, spices, seasoning herbs, horseradish, flavoring extracts, and many other materials often spoken of as "condiments." These are not discussed at length, because they are not absolutely needed by the body. They may, however, be very useful in making an otherwise unattractive diet taste good. In fact, the secret of making inexpensive meals attractive lies largely in the skillful use of seasoning and flavors,

and in this way they may well be worth the cost they add to the diet, even if they do not increase its actual food value.

"Any kind of food contains one or more of the substances just described, and they are combined in as many different ways as there are kinds of food. A satisfactory diet contains all of them, and each in its proper proportion, and the problem of planning meals is really that of choosing foods which will do this.

Grouping Foods to Show Their Uses

"Perhaps as easy a way as any to select the right foods is to group the different kinds according to their uses in the body, and then to make sure that all the groups are represented regularly in the meals. Fortunately no more than five groups need be considered: (1) Fruits and vegetables; (2) meats and other protein-rich foods; (3) cereals and other starchy foods; (4) sweets; and (5) fatty foods.

"*Group 1*—Fruits and vegetables, such as apples, bananas, berries, citrus fruits, spinach, and other greens, turnips, tomatoes, melons, cabbage, green beans, green peas, green corn, and many other vegetables and fruits. Without these the food would be lacking in mineral substances needed for building the body and keeping it in good working condition; in acids which give flavor, prevent constipation, and serve other useful purposes; and in minute quantities of other substances needed for health. By giving bulk to the diet they make it more satisfying to the appetite.

"*Group 2*—Meat and meat substitutes, or protein-rich foods: moderately fat meats, milk, poultry, fish, cheese, eggs, dried legumes (beans, peas, lentils, cow-peas, peanuts), and some of the nuts. These are sources of an important body-building material, protein. In the case of children part of the protein food should always be whole milk.

"*Group 3*—Foods rich in starch: Cereals (wheat, rice,

rye, barley, oats, and corn) and potatoes (white and sweet). Cereals come near to being complete foods, and in most diets they supply more of the nourishment than any other kind of food. It is not safe, however, to live only on cereals. The grains may be simply cleaned and partially husked before cooking, as in cracked wheat and Scotch oatmeal; they may be ground into flour and used as the basis of breads, cakes, pastry, etc.; or they may be partially cooked at the factory, as in many breakfast preparations; or they may be prepared in the form of such pastes as macaroni, noodles, etc. In all these forms they furnish the body with the same general materials, though in different proportions.

"*Group 4*—Sugar (granulated, pulverized, brown, and maple), honey, molasses, sirup, and other sweets. Unless some of the fuel is in this form the diet is likely to be lacking in flavor.

"*Group 5*—Foods very rich in fat: Bacon, salt pork, butter, oil, suet, lard, cream, etc. These are important sources of body fuel. Without a little of them the food would not be rich enough to taste good.

"Some food materials really belong in more than one group. Cereals, for example, supply protein as well as starch; potatoes supply starch as well as the mineral matters, acids, cellulose, and body-regulating substances, for which they are especially valuable; and most meat supplies fat as well as protein. For the sake of simplicity, however, each material is here grouped according to the nutrient for which it is usually considered most valuable.

"The lists given below show some of the common food materials arranged in these five groups. If the camper will consult them in planning meals until he has learned where each kind of food belongs, he will have taken the first step toward providing a diet which will supply all the food needs of the party. It will be only one step, to be sure, but it should prevent two mistakes—that of serving meals that have not

sufficient variety, and that of cutting down in the wrong places when economy either of time or money is needed:

"GROUP 1—FOODS DEPENDED ON FOR MINERAL MATTERS, VEGETABLE ACIDS, AND BODY-REGULATING SUBSTANCES

Fruits	Vegetables
Apples, pears, etc.	Salads—lettuce, celery, etc.
Bananas	Potherbs or "greens"
Berries	Potatoes and root vegetables
Melons	Green peas, beans, etc.
Oranges, lemons, etc.	Tomatoes, squash, etc.

"GROUP 2—FOODS DEPENDED ON FOR PROTEIN

Milk, skim milk, cheese, etc.	Fish
Eggs	Dried peas, beans, cow-peas, etc.
Meat	Nuts
Poultry	

"GROUP 3—FOODS DEPENDED ON FOR STARCH

Cereal grains, meals, flours, etc.	Macaroni and other pastes
Cereal breakfast foods	Cakes, cookies, starchy puddings, etc.
Bread	Potatoes and other starchy vegetables
Crackers	

"GROUP 4—FOODS DEPENDED ON FOR SUGAR

Sugar	Candies
Molasses	Fruits preserved in sugar, jellies, and dried fruits
Sirups	Sweet cakes and desserts
Honey	

"GROUP 5—FOODS DEPENDED ON FOR FAT

Butter and cream	Salt pork and bacon
Lard, suet, and other cooking fats	Table and salad oils"

Plan of Meals for Men with no Pack-Horse

BREAKFAST	DINNER	SUPPER
Quick bread	Quick bread	Soup
Salt meat	Meat or meat substitute	Vegetable
Gravy	Starchy vegetable	Bran crackers or biscuits
Beverage	Green vegetable (dried vegetable or edible weeds)	Fruit
	Dessert	Beverage
	Beverage	

Suggestive Food Lists

QUICK BREADS

Dough boys
Emergency biscuits
Corn bread
Bran gems
Flapjacks
Dough gods
Sour-dough biscuits

CEREALS

Rolled oats
Farina
Rice
Hominy
Macaroni

VEGETABLES—DRIED

Navy beans
Lima beans
Lentils
Peas
Carrots
Onions
Potatoes, etc.

FRESH

Water cress
Sorrel
Lamb's quarter
Mustard
Yellow dock
Dandelion

FRUIT—DRIED

Peaches, stewed or raw
Apricots, stewed or raw
Prunes, stewed or raw
Figs, stewed or raw
Dates
Raisins

BEVERAGES

Coffee
Tea
Cocoa

MEAT

Bacon
Ham
Game or fish

DESSERTS

Prune, Dumplings, Pie
Apricot, Dumplings, Pie
Peach, Dumplings, Pie

MEAT SUBSTITUTES

Cheese
Beans
Eggs

Suggested Plan of Meals for Men with Pack-Horse

BREAKFAST	DINNER	SUPPER
Cereal	Meat or substitute	Soup
Salt Meat	Vegetable	Vegetable
Gravy	Starchy	Laxative bread
Quick bread	Green	Fruit
Beverage	Quick bread	Beverage
	Dessert	
	Beverage	

Food Lists

CEREALS

Rolled oats
Rice
Graham mush
Farina and dates or figs
Corn-meal mush

SALT MEAT

Bacon
Bacon fritters
Bacon and dumplings
Bacon and gravy
Ham and gravy
Corn-beef stew or hash
Kippered herring
Codfish balls
Creamed dried beef

MEAT SUBSTITUTES

Cheese
Beans
Eggs

VEGETABLES—DRIED

Onions
Carrots

FRESH MEAT

Mulligan
Fish chowder, cakes, baked
Creamed salmon
Meat pie
Liver and bacon, etc.

SOUPS

Bean
Split pea
Lentil
Peanut butter

BREADS—QUICK

Dough-boys
Corn bread
Brown bread
Baking-powder biscuits
Emergency biscuits
Bran gems
Graham gems
Flapjacks
Griddle cakes
Dough gods
Sour-dough biscuits

VEGETABLES—DRIED—*Continued*

Spinach
Macaroni and cheese
Baked beans
Lima beans
Lentils
Hominy

FRESH

Potatoes
Baked, boiled, fried
Lyonnaise
Water cress
Edible weeds cooked
Fried onions

CANNED

Corn
Tomatoes

DESSERTS

Fruit (stewed)
Prunes
Apricots
Peaches
Figs
Raisins
Dates
Prune, etc., pie, dumplings, loaf
Cinnamon rolls
Gingerbread
Cake

Beverages

COCOA

One cup condensed milk diluted to 3 cups, 3 teaspoons cocoa, 3 teaspoons sugar (if cocoa is unsweetened). Heat the milk, add sugar to the cocoa and mix with a little hot milk. Add the remainder of the milk, heat and serve.

COFFEE

Add coffee to cold water, keep hot by the fire, allowing it to simmer but not boil until desired strength. Add cold water to settle. The coffee may be put in a small bag, made of muslin or cheesecloth, tied loosely, and the bag of grounds removed before serving.

COFFEE EXTRACT

Put ½ teaspoon (more or less, according to taste) in a cup and add boiling water.

TEA

One teaspoon of tea for each cup. Pour over fresh boiling water, set aside in a warm place 3 or 4 minutes to steep, then serve.

CEREAL COFFEE

Put ½ teaspoon (more or less, according to taste) in a cup and add boiling water. Stir. Add cream and sugar and serve.

Breads

All the measurements used are "level" unless otherwise specified.

In camp, man probably realizes more fully the truth of the statement that "bread is the staff of life" than he does in any other type of living. This adage, however, does not apply to bread "made out of putty and weighted with lead," a description which too often represents the camp bread. This need not be the case, however, for good wholesome breads may be made in camp as well as in the kitchen.

The baking powder breads are most commonly used in camp, being quickly and easily prepared. These involve the use of chemical leavening agents which render them less wholesome than those made by means of yeast (dry yeast may be carried into camp), as a source of leavening power. In addition to the unwholesomeness, one grows very tired of the baking-powder breads, and the appetite demands a change which should be supplied in the form of yeast bread, salt-rising bread, etc., recipes for which are given in this book. It is very desirable to use some laxative bread at least once a day, as the deficiency of vegetables is likely to cause constipation. The bran breads given are excellent for this purpose.

FLAPJACKS

2 cups of pancake or prepared flour
Enough water to make a thin batter (about ¾ cup) or
2 cups flour
4 teaspoons baking powder
½ teaspoon salt
About ¾ cup water or condensed milk

Mix the dry ingredients very thoroughly and add liquid; beat very well before frying. The pan must be very hot and well oiled, but not too much fat should be used or the cakes will be soggy.

GRIDDLE CAKES

2½ cups flour
1 tablespoon sugar
½ teaspoon salt
4 teaspoons baking powder
1½ cup milk (condensed may be used)
1 egg if possible

Add the milk to the dry ingredients, and then the egg, beating vigorously before frying.

CARAMEL SIRUP

1 cup water
1½ cup brown sugar

Boil until the consistency of maple syrup.

DOUGH-BOYS

2 cups flour
4 teaspoons baking powder
½ teaspoon salt
2 tablespoons sugar
Water or condensed milk to make a stiff batter

Mix the flour, baking powder, and salt, and add enough water for a stiff dough. Drop by spoonfuls into an inch of bacon fat which is smoking hot, and cook until a deep brown on both sides.

EMERGENCY BISCUIT

2 cups flour
1 tablespoon sugar
4 teaspoons baking powder
½ teaspoon salt
2 tablespoons lard or bacon fat
¾ cup water or condensed milk

Mix the dry ingredients, then add the melted fat and enough liquid to make a soft dough that can be dropped from a spoon on a pan without spreading much. Bake in reflector or improvised oven.

BAKING-POWDER BISCUIT

Same ingredients as for Emergency Biscuit, only less liquid is used, and the dough is patted out to one-half inch thickness and cut with a can into biscuits and baked.

BRAN MUFFINS

1 cup bran
1 cup flour
4 teaspoons baking powder
½ teaspoon salt
1 tablespoon lard or bacon fat
1 tablespoon sugar
⅔ cup water or condensed milk

Mix dry ingredients, and add the liquid, then the melted fat. Mix well and bake in muffin pan, or drop from a spoon on a biscuit pan.

BRAN BREAD

Add a few raisins to the recipe for Bran Muffins and bake in a loaf.

QUICK MUFFINS

2 cups flour
3 teaspoons baking powder
1 tablespoon sugar
½ teaspoon salt
1 cup milk or water
1 tablespoon melted fat
1 egg if possible

Mix dry ingredients, add the liquid, melted fat, and the egg. Mix well. Bake in a muffin pan, or in a flat biscuit pan.

CINNAMON ROLLS

2 cups flour
2 tablespoons raisins cut in small pieces
4 teaspoons baking powder
2 tablespoons sugar
½ teaspoon salt
4 tablespoons lard or other fat
Water or condensed milk to make a soft dough (about ⅔ cup)

Roll the dough about ¼ inch thick and spread on it a little melted fat and the following mixture: 1 teaspoon cinnamon, 3 tablespoons sugar, 1 tablespoon flour, 1 tablespoon water. Roll the sheet of dough into a cylinder and cut off ½ inch slices. Spread the top with sugar and cinnamon mixture, and bake. The dough may be sprinkled with sugar and cinnamon if preferred.

HOT CROSS BUNS

2 cups flour
¼ teaspoon salt
3 teaspoons baking powder
4 tablespoons fat
½ cup liquid (water or condensed milk)
¼ teaspoon nutmeg
¼ teaspoon allspice or cinnamon
½ cup raisins or currants

Mix as for baking-powder biscuits, adding the spices and the fruit cut in pieces to the other dry ingredients. Shape into cakes with the hands and mark with a cross on top. Bake about 20 minutes.

CORN BREAD

1 cup flour
½ cup yellow corn meal
3 teaspoons baking powder
1 tablespoon sugar
1 tablespoon lard
½ teaspoon salt
¾ cup water or condensed milk
1 egg if desired

Add the liquid to the dry ingredients, and then the melted fat and mix. This bread may be baked as muffins or as a loaf.

BROWN BREAD

½ cup molasses
4 tablespoons sugar (brown if possible)
2/3 cup liquid (water or condensed milk)
½ teaspoon soda
½ teaspoon salt
2 teaspoons fat
2 cups graham flour
4 teaspoons baking powder
A few raisins if desired

Add the molasses and liquid to the dry ingredients and mix. Then steam for 3 hours, by setting corn sirup cans or baking powder cans filled with the mixture in a kettle of boiling water, and closing tightly.

GRAHAM GEMS

1½ cup graham flour
½ cup flour
3 tablespoons sugar
½ teaspoon salt
1½ tablespoon melted fat
3 teaspoons baking powder
1¼ cup liquid

Add the liquid to the dry ingredients. Mix well. Then bake in muffin pans, or drop on an oiled biscuit pan and bake.

CORN DODGERS

2 cups corn meal
½ teaspoon salt
1 teaspoon sugar

Wet these materials with boiling water and shape into flat cakes, about an inch thick, and fry, or bake on hot stones.

PULLED FIRE BREAD

Make a good stiff dough, using
1 cup flour
¼ teaspoon salt
About 2 or 3 tablespoons water

Pull it out into a long thin strip, wrap this strip corkscrew-like on a stick with its bark on. Hold over very hot fire or ashes, turning constantly until done. This bread is easily prepared when equipment is limited.

UNLEAVENED BREAD

2 cups flour
½ teaspoon salt
1 teaspoon sugar

Mix with water to stiff dough and knead and pull until tough and elastic. Roll out thin as a soda cracker, score with a knife, and bake. If mixed with a very small amount of water this bread may be kept for a long time like hard-tack.

RANCHMAN'S OR SOUR-DOUGH BREAD

In a five-pound lard pail mix enough flour and water to make a medium thick batter. To this add one tablespoon of sugar. The pail should be only 2/3 full. Allow this to stand until the mixture has fermented and then become sour. Pour out about ½ cup of the sour dough to start the fermentation in a new mixture. To the dough in the pail add ½ teaspoon

soda, ½ teaspoon salt, 1 teaspoon melted lard, and enough flour to make a very soft dough. Mix well. Melt a teaspoon of lard in a pan and drop the dough in by the spoonful, turning it over in the fat. Allow to rise until double in bulk and then bake. The ½ cup of sour dough which has been reserved may be poured back into the lard pail and the original quantity of batter stirred up. This will be sour and ready for use in a very few hours. This procedure may be continued indefinitely. The exact amount of soda needed depends upon the sourness of the dough, and it must be determined by experience.

SALT-RISING BREAD

1 tablespoon of fresh corn meal, ½ cup scalded milk or water. Add milk to corn meal while hot. Keep in a warm place for about 12 hours, or until fermentation begins, indicated by bubbles. Rinse out a bowl or kettle with boiling water, and mix up a stiff batter of about 3 cups of flour with some water, adding ½ teaspoon of salt. Stir into this mixture the fermented corn meal. Stand in lukewarm water until twice in bulk, keeping at an even temperature. Put about 2 quarts of flour into a large kettle, scooping out a well in the center. Pour in the fermented sponge and add enough lukewarm water or milk to make into a stiff dough which can be kneaded. When quite tough and elastic, about 20 minutes' kneading is required, shape into loaves, and put into pans. When risen again twice in bulk, bake in Dutch oven or reflector.

DOUGH GODS, OR FRYING-PAN BREAD

Dough gods may be prepared by adding either "shortening" or sugar, or both, to the mixture, according to their availability and the taste of the camper.

1 sack flour (1 cup only is used)
2 teaspoons baking powder
1 teaspoon salt
½ cup water

Open the sack of flour, punch a depression in the surface, sprinkle the baking powder and salt over the exposed area, stir thoroughly with a knife blade, mixing the ingredients with the flour, which becomes loosened from the sides and bottom of the depression, until approximately one cup of flour has entered the mixture. Again punch a depression, this time indenting the surface of the prepared flour. Into this cavity pour ½ cup water and stir gently with a knife blade, causing the loose flour on the adjacent walls to tumble gradually into the water. As the paste thickens and approaches a dough, set aside the knife and use the fingers of both hands to stiffen the dough. The fingers should be clean, dry,

and covered with flour to prevent the dough from sticking. A couple of deft strokes, tumbling the dough gently about in the flour, will stiffen it sufficiently to be lifted from the sack. If the quantity prepared is more than necessary for one fry pan, it may be easily pulled apart into halves. During the process described, a well greased (about 1 teaspoon bacon fat) frying pan should be kept hot over the fire. It is now removed for a moment to a firm base, and the dough placed in the hot fat and spread evenly about with the back of the fingers, the fingers being freshly protected with dry flour. Next indent with the forefinger the center of the dough and fill this hole with hot fat. With the back of the knife mark creases which will indicate the divisions into which the loaf will later be broken.

Baking. Place the frying pan and contents immediately over hot coals. As the bottom of the dough bakes shift it in the pan to avoid burning. This requires skill, but is accomplished by a simple little twist of the wrist. Next remove the pan to semi-perpendicular position by propping it near the hot coals. The contents are thus exposed directly to reflected heat. In a few minutes the dough god becomes brown and is baked.

LIQUID YEAST

4 medium sized potatoes (pared)
1 qt. water
½ cup sugar
1 cake dry yeast
1 teaspoon salt
1 tablespoon flour

Cook the potatoes in the water, mash them and add the flour, sugar and salt, to which has been added 2 tablespoons cold water, and cook until thickened. Cool to lukewarm and add the yeast cake which has been soaked in ¼ cup lukewarm water. Allow to ferment about 24 hours. Place in a jar and set in a cool, dark place. This will keep about 2 weeks, and the last cup of it may be used in place of a dry yeast cake in making a new supply.

YEAST BREAD

About 3½ quarts flour
1 quart scalded and cooled sweet milk, or water
¼ cup sugar
¼ cup fat
1 cup liquid yeast or 2 dry yeast cakes soaked in ¼ cup lukewarm water
1 tablespoon salt

Mix above ingredients, using only one-third of the flour, and allow to become thoroughly light; stir in remainder of flour and work until perfectly smooth. The amount of flour will vary somewhat with the kind used. Allow to rise until more than twice the original bulk. Shape into loaves with as little working as will permit of smoothness. Allow to rise again and bake in moderate oven. Good bread may be made by adding enough flour at the first to make a stiff dough, thus omitting the sponge entirely.

RICE CAKES

When cold boiled rice is left over, mix with an equal quantity of flour, ¼ teaspoon salt, and 1 teaspoon baking powder being added to each cup of the mixture. Then fry as flap-jacks. Cold boiled potatoes or oatmeal may be used in the same way. Rice cakes are best mixed with the water in which the rice was cooked.

Cooking of Cereals

Many cereal preparations for making breakfast porridge are on the market, put up in one-pound or two-pound packages, paper or tin, with directions for cooking. In nearly all cases, time allowed for cooking is not sufficient unless the dish containing it is brought in direct contact with the fire, which is not the best way. Porridge should be cooked in a fireless cooker or over hot water, without stirring. If a double boiler is not procurable, improvise one by putting a smaller kettle in a large kettle containing water. Boiled water and salt should always be added to cereals, allowing one teaspoon of salt to each cup of cereal. Corn meal and finely ground preparations should be mixed with cold water before adding them to the boiling water in order to prevent lumping. The diet will be much improved if raisins, dates, and figs, which are carried in so little space, are added to the cereals while they are cooking.

Cereals and Vegetables

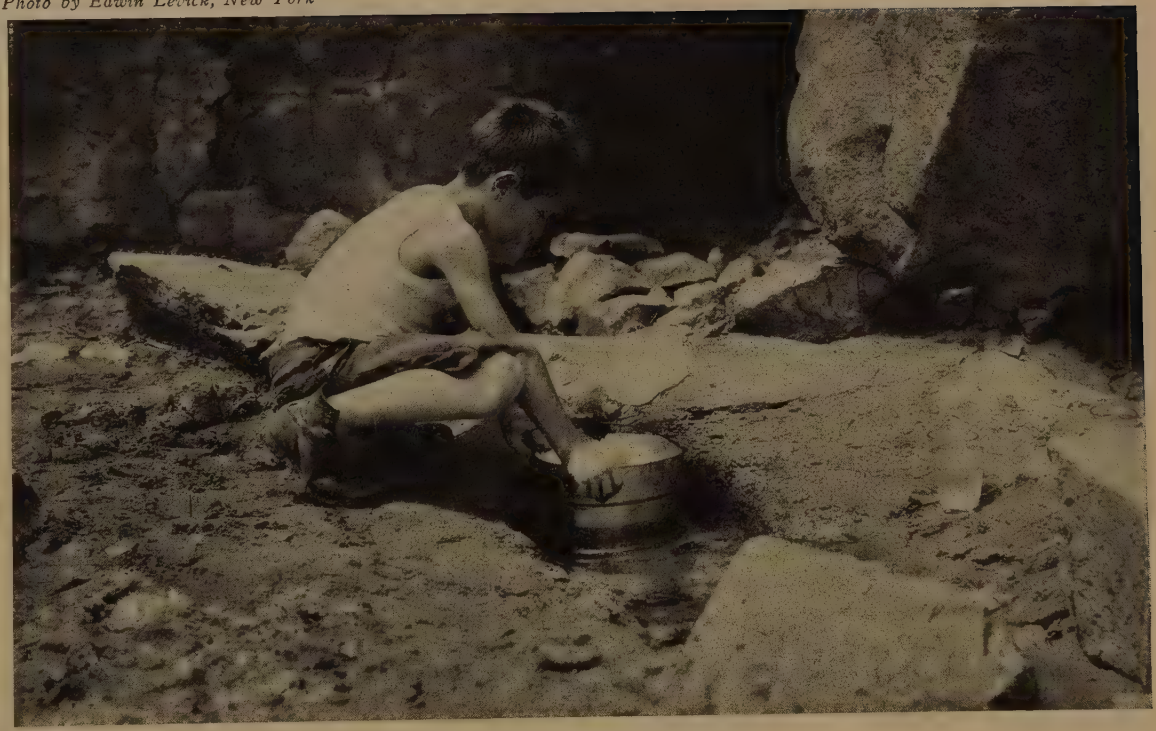
MACARONI AND CHEESE

Cook macaroni in boiling salted water twenty minutes, or until soft. Drain. To each cup of cooked macaroni add ¼ cup tomato catsup or

Photo by Edwin Levick, New York

NOT SO VERY HUNGRY

Photo by Edwin Levick, New York



BETTER THAN THE TOWN PUMP

1 cup canned tomatoes (this may be omitted), a little cayenne pepper, salt, and two tablespoons of cheese cut in small pieces. Cover with water or condensed milk, diluted, and bake 15 minutes.

BOILED RICE

Wash the rice well and sprinkle into a kettle of salted water, boiling hard all the time. After thirty or forty minutes pour off the water and place the kettle near the fire so that the grains may dry and swell. Rice is most satisfactorily cooked in a fireless cooker.

RICE AND CHEESE

Boil 1 cup of rice for every six persons, using plenty of water, boiling rapidly to make the grains whole and separate; add ½ teaspoon of salt. When tender put a layer of the rice into a pan, then a layer of thinly sliced cheese, salt and pepper, another layer of rice, cheese, etc., until the pan is filled. Pour over this 1 cup of diluted condensed milk, sprinkling pepper over the top, and bake.

BAKED BEANS

Soak 1 quart of beans over night in cold water. Drain, and cover with fresh water, adding a pinch of soda, and boil for an hour. Pour off this water, add fresh hot water, and cook until the skins burst and the beans seem quite soft. Add to beans and mix:

1 tablespoon salt
A little pepper
6 tablespoons molasses
¼ cup sugar
4 or 5 slices salt pork or bacon

Place in a pan or bean jar, burying the pork in the beans, and bake from 6 to 8 hours.

CREAMED LIMA BEANS

Soak 1 cup of dried Lima beans for several hours in enough water to cover. Drain. Add 2 pints water and cook slowly until tender. Add 1 cup of condensed milk and let simmer for ½ hour. Season to taste.

CREAMED LENTILS

Use the same method as that used for Creamed Lima Beans.

BAKED POTATOES

Wash the potatoes and bake in a frying pan covered with a lid, or in an oven, or in ashes.

POTATOES BOILED IN JACKETS

Wash potatoes thoroughly and cut a small piece from each end, which gives vent to the steam and keeps the potatoes from bursting. Put them into cold water (not boiling) and cook gently but continuously, adding salt to the water at first. When done drain the water off, and dry before the fire and serve.

FRIED POTATOES

Wash and pare potatoes, cut in ½'s lengthwise, and dry on a clean towel. Fry in fat. Drain and sprinkle with salt. Cold boiled potatoes may be used in place of fresh ones.

SPINACH SAUTE

Soak dried spinach in a small amount of cold water until it has absorbed a good deal. Boil in the same water until soft. To each cup of this boiled spinach add

1 tablespoon butter or bacon fat
1 teaspoon lemon juice or vinegar
Salt and pepper to taste

Melt fat, add spinach, sprinkle with seasonings, and cook slowly until the fat is absorbed. Add the lemon juice or vinegar and serve.

CREAMED SPINACH

Soak and cook spinach as in above recipe. To each cup of boiled spinach add

1 tablespoon butter or bacon fat
1 tablespoon flour
½ cup milk
Salt and pepper

Melt fat in frying pan, add the cooked spinach, cook for a few minutes, sprinkle with flour and seasonings, stir, add milk gradually. Cook for 5 minutes.

BOILED HOMINY

Hominy may be soaked in cold water, and cooked until soft and tender, or boiled without soaking, which will require about an hour. Use 1 cup hominy to 4 cups water. Season to taste. Milk may be added, or bacon fat is also good.

FRIED HOMINY

Boiled hominy when fried in bacon fat makes a very acceptable dish.

DRIED VEGETABLE DISHES

All dried vegetables should be soaked in water to cover for a period of 24 hours if possible. They then require long, slow cooking, using this same water.

MASHED SQUASH

Soak squash 12 hours in the proportion of 3 parts of water to 1 part squash. Boil slowly in the same water 30 to 40 minutes. Mash well, add butter, salt, and pepper. Serve.

MASHED POTATO

Soak 12 hours in the proportion of 3 parts of water to 1 part potatoes. Boil in the same water 45 minutes to 1 hour. Drain, steam 5 minutes, mash. Add butter, salt, pepper, and a little hot milk. Beat with a fork until creamy. Serve.

CREAMED VEGETABLES

Potatoes, turnips, carrots, and onions which have been soaked and cooked according to the above directions make delicious creamed dishes by adding to them a sauce in the following proportions: For each cup of cooked vegetables make a sauce from ½ cup milk, 1 tablespoon fat, and 1 tablespoon flour. Combine flour and the fat, add milk and cook well. Add vegetables and season to taste.

BUTTERED VEGETABLES

Turnips, beets, beans, carrots, and onions cooked according to the above directions are good when served with melted butter or bacon fat.

GLAZED CARROTS

Soak and cook carrots until tender. Place in a buttered baking dish and cover with a sirup made by boiling 3 tablespoons sugar with a little water. Dot over bits of butter and bake in a slow oven for ½ hour.

HASHED BROWN POTATOES

Soak and cook potatoes until tender. Cut in small pieces, place in a frying pan and brown in butter or bacon fat.

MASHED TURNIPS

Soak and cook turnips until tender. Mash, flavor with butter or bacon fat. Serve.

VEGETABLE SOUP (EVAPORATED)

To each cup of soup vegetables add 2 cups water and soak for 24 hours. Cook, adding as much water as necessary. Flavor with butter and salt. Meat broth is a good addition.

POTATO SOUP (GRANULATED)

1 cup granulated potatoes
2 cups water
1 cup milk
2 tablespoons butter
2 tablespoons flour
2 slices onion chopped fine
2 teaspoons salt

Cook potatoes in boiling water until tender and easily mashed. Add the milk and thicken with butter and flour rubbed into paste. Cook well.

Soups

BEAN SOUP

1 cup beans
2 quarts water
½ cup tomatoes (may be omitted)
1 slice onion
Salt and pepper

Boil the beans and water until the beans lose their shape and can be easily mashed up. Add the tomatoes, onions, salt and pepper, boil 5 minutes and serve. Lentils are good combined with beans in this kind of soup, or split peas may be used.

PEANUT SOUP

2 teaspoons flour
2 teaspoons peanut butter
1 pint milk Small amount water

Heat milk and stir into it the peanut butter, which has been thinned with a small amount of water to prevent its forming into lumps. Combine the flour with enough water to form a smooth paste, stir this into the hot milk and allow to cook for several minutes in double boiler. Season to taste.

SPLIT PEA SOUP

1 cup dried split peas
2 quarts water
1 pint milk or 1 pint meat broth
½ onion
3 tablespoons fat (butter or bacon fat)
2 tablespoons flour
1½ teaspoon salt
Pepper
2-inch cube fat salt pork

Pick over peas and soak several hours, drain, add cold water, pork, and onion. Simmer 3 or 4 hours, or until soft. Rub through a sieve or mash. Thicken with a batter made from the flour and a little water. Add butter or other fat and seasoning. Dilute with milk or meat broth.

POWDERED SOUPS

To one tablespoon or more of the powdered mixture add 1 cup of cold water. Cook until a thickened soup is formed. These soups may be purchased in some variety—pea, bean, lentil, and turtle.

Curing Meats in Camp

SUN-DRIED OR JERKED MEAT

For preserving in this manner meat should be sliced in long thin strips and salt worked in, and allowed to stand for a few hours so that it may be absorbed. It should then be hung over cords or poles in the hot sun to dry for a few days. Pepper may be sprinkled on it, or it may be smoked well for a day over a thick smoke on a frame of green twigs. When properly cured, the strips are dry to the touch and have shrunken to one-half of their former size.

CURED FISH OR MEAT

In preparing fish for drying, split them along the back, remove the backbones and entrails, salt, and hang them up on a frame over a slow smudge until they are well smoked. Then place in a trough made from a soft wood log and cover with a weak brine for about thirty-six hours. Smoke them

over a small fire for three days. Meat may be cured by the same process.

Cooking Meats in Camp

Meat, game, and fish may be prepared in numerous ways in camp. They may be stewed, broiled, roasted, or fried. The tenderest parts are best for broiling and roasting. The tougher portions are made more palatable by long slow cooking, as stewing and braising.

STEWING

2½ pounds meat, 2 cups potatoes cut in slices, turnips and carrots cut in cubes, ½ onion, 2 tablespoons flour, salt and pepper. Cut meat from the bone in cubes about 1½ inch thick, season with salt and pepper and dredge with flour. Cut fat in small pieces and fry out in hot kettle. Add meat and stir until well seared. When browned, add pieces of bone, cover with boiling water and boil about 5 minutes, then cook at lower temperature until meat is tender. Add the vegetables (except potatoes) the last hour of cooking, and add potatoes 20 minutes before removing from fire. Remove bones, large pieces of fat, and then skim. Thicken with 2 tablespoons flour diluted with enough cold water to pour easily. Dumplings may be added to the stew.

BRAISING

Place the meat in a Dutch oven or covered kettle with about two inches of hot water in the bottom. Various vegetables or combinations of vegetables, as sliced onions, potatoes, turnips, and tomatoes, may be added and cooked slowly for several hours. One hour before removing from the fire salt should be added.

Gravy may be made by pouring some of the liquor from the kettle and adding a little hot water, salt and flour (4 tablespoons flour to 1 cup liquid), mixed until smooth, and cooked until thick.

BROILING

Meat should be cut at least one inch thick for broiling. Venison should be well pounded. Sear in the flames of the fire, and then cook in front of a good bed of coals.

A steak one inch thick should be cooked about ten minutes.

Steaks may be broiled between two large, clean, flat, hot stones.

ROASTING A BIRD

In roasting a bird, clean it in the usual way, then split it down the back and put two or three little sticks in it to keep it as flat as possible. If you have any bacon, cut a few holes in the thick part of the bird and stick some thin strips of bacon in the meat, then rub salt on it. Find a pole several feet long—on one end tie a string and on the other end of the string tie the bird. Set the pole slanting in the ground or lean it against a log, weighting the lower end with a rock. Let the bird hang close to the coals of the camp fire. Twist occasionally, or as often as it stops revolving. The longer the string, the longer the turning goes on without attention. A short piece of wire for the lower part of the string lessens the danger of the string burning.

ROASTING MEAT

Build a high fire against a log or pile of rocks to reflect the heat. Keep the roast in the flames until the outside is well seared, and then cut gashes in the meat and insert strips of bacon or salt pork. Hang on a thick string from a pole or tripod in front of the fire. Put a pan underneath to catch the drippings. Turn frequently, and baste with the meat fryings. Make gravy from the drippings.

To roast in a reflector, put the meat in a pan containing a little water, and cover the top of it with slices of bacon. Baste frequently. When the front of the roast is cooked, reverse the pan.

BARBECUING

To barbecue is to roast the whole carcass of an animal. Baste often with the following dressing.

1 pint vinegar
½ can tomatoes
1 teaspoon pepper (cayenne)
1 teaspoon salt
2 teaspoons black pepper
2 tablespoons lard

Tie a piece of cloth on a stick and keep the meat well basted with the dressing as long as it is on the fire.

BAKING IN A HOLE

Dig a hole in the ground about 18 inches square and 12 inches deep. Place kindling in it and over the hole build a cob house by laying split wood sticks across, not touching each other, and so on until you have a

stack two feet high. Set fire to it and burn to coals. Cut up the meat, and season, adding a small piece of fat pork. Put in a kettle, pour in water to cover, put on the lid, rake coals out of the hole, putting the kettle in. Shovel the coals around and over it, cover all with a few inches of earth and let it alone over night.

BAKING AN ANIMAL IN ITS HIDE

If the animal is too large to bake entire, cut off what you want and sew it up in a piece of its hide. Line the hole with flat stones. Rake out coals and put meat in, cover first with green grass or leaves then with coals and ashes and build a fire on top. When done remove the hide.

BAKING IN CLAY

Dress the animal, but leave the skin and hair or feathers on. If it is a large bird, cut off the head and feet and pinions, and pull out tail feathers and cut tail off (to get rid of oil sack). If fish, do not scale. Stir clay in a pail of water until like thick porridge. Dip the bird in this, and repeat until it is a mass of clay. Lay this in the embers or ashes, being careful to dry the outside. Bake until the clay is almost burned to a brick.

This mode of cooking should never be tried in regions where there is not real clay.

VENISON—TO DRESS AND COOK

"If possible, skin the deer while yet warm, and it will save trouble. To skin a frozen animal is difficult. Hang the deer by one hind leg, cut the skin from the top joint to the second joint of the leg, make an incision around the hock and then begin the process of skinning downward. It will peel quite easily if handled gently. When the legs are bare, cut the skin down the center of the body to the breast, being careful not to cut into the flesh. Then with gentle force, draw the skin off the whole carcass, using the knife when necessary. A sharp knife is indispensable. The head may be skinned or it may be cut off without. After the deer is skinned, hang up by the hind legs, insert a sharp knife in the breast and split open the full length. Open the deer and keep open with a smooth and slender stick. Put the hand above the kidney end, with a gentle pull release the entrails, which will come out easily, leaving the liver, heart, and lungs. The animal is now ready for use. Let it hang for twenty-four hours before cutting up. Then split in quarters, the hind quarters being the best. The flesh, if roasted, will be dry if bacon is not used on it. Grill chops over hot coals or on red-hot griddle. Do not try to fry in fat. The liver and heart are good baked in a pan in the oven with onion and small cubes of salt pork."—Kephart's "Camp Cookery."

RABBITS AND SQUIRRELS

Rabbits and squirrels are pests to the farmer, and except in the spring of the year are desirable food.

The "gray digger" squirrel and the "cotton tail" rabbit are abundant in many sections of the country.

The camper in utilizing such game for food not only adds variety to his diet in camp but performs a distinct service to the farmer.

FRIED RABBIT

Rabbits must be very tender for this purpose. Clean, cut into joints; soak for half an hour in salt and water (1 tablespoon of salt to 1 quart of water), dip in flour and fry brown in one-third cup of lard or substitute.

STEWED RABBIT

The older rabbits may be stewed. Clean, wash, cut into joints and soak rabbit in salt and water (one tablespoon salt to one quart water). Put in kettle with cold water enough to cover, salt slightly and stew until tender. Boiled onions (three medium sized to one rabbit) may be added to this stew if desired.

FRIED SQUIRREL

The young squirrel may be fried. (Follow directions for frying rabbit.)

SQUIRREL STEW

This dish may be prepared by substituting squirrel for meat in recipe for Mulligan.

BROILED SQUIRREL

Young squirrel or rabbit may be broiled according to directions for roasting a bird.

Note: To hold over Fish or Game.

Draw as soon as possible, rinse with soda and water (1 tablespoon of soda to 1 quart of water); then with fresh cold water. Wipe dry and rub lightly with a mixture of salt and pepper, and hang in a cool place with a cloth thrown over them. A little soda water will help to sweeten fish from muddy waters.

Carp, catfish, and other fish taken in stagnant or muddy waters are improved by soaking over night in fresh water, moderately salted.

BACON FRITTERS

Slice bacon or salt pork, soak in cold water for an hour, roll in corn meal or flour, and fry in bacon fat.

BACON AND GRAVY

Fry bacon until light brown and crisp. Remove from the pan and stir in some flour, mixing thoroughly with the fat in the pan, fat and flour being in about the following proportions: for 1 cup gravy, 2 tablespoons bacon fat and 2 tablespoons flour. Brown these together and add the cup of hot water gradually, stirring to avoid lumps.

CREAMED DRIED BEEF

Dilute ½ pint of condensed milk by adding twice the quantity of water. Put over the fire and bring to the boiling point. Stir together about 4 tablespoons flour with enough water to make a thin batter. Add this to the hot milk and stir until it becomes thickened. Add a 1-lb. can of dried beef, or 2 cups of any dried meat or fish, cut in small pieces.

CORNED-BEEF HASH

Chop some canned corned beef fine, with slices of dried onions. Add two parts of boiled potatoes to one of the meat, cutting up in small pieces. Season with pepper and a little mustard. Put some pork fat in a frying pan, melt, add hash and cook until nearly dry and a brown crust is formed. Evaporated potatoes and onions can be used instead of the fresh.

BOILED CORNED BEEF

Put the raw meat into enough cold water to cover it. Let it come slowly to a boil, and then simmer until done.

MULLIGAN

Put over the fire a joint of beef or mutton placed in cold water, and bring to the boiling point, cooking slowly until tender. Add onions cut in small pieces. Tomatoes, peas, corn, and other vegetables may be added. Cook until vegetables are well done. Thicken with a little flour mixed with a small quantity of water to form a thin batter. Cook for at least ten minutes. Vegetables used in making Mulligan may be fresh, dried, or left-over ones, and the proportions may vary according to the amount available.

CODFISH BALLS

Shred the fish into small pieces. Pare some potatoes (1 cup of fish to 1 pint of raw potatoes). Cook the potatoes until soft, drain off the water, and mash fish with them. Beat until light, add seasoning, and shape into cakes. Fry in very hot fat.

STEWED CODFISH

Soak over night in cold water. Place in pot of fresh cold water and heat slowly until soft.

CODFISH HASH

Mash stewed codfish with potatoes and onions, season, and fry like corned-beef hash.

FISH CHOWDER

Cut two or three small slices of pork or bacon and fry out in a kettle. Put in 3 or 4 onions, then a cup of fish cut in slices, 1 cup of potatoes, and ¼ cup of dry bread. Season with salt and pepper, add 1 quart of water and stew slowly until well done.

FISH CAKES

Take cold cooked fish and remove the bones; mince and mix with equal parts of bread crumbs and potatoes. Season well and fry in a little fat. Brown well on both sides. These are improved by the addition of a little onion.

FISH BAKED

This method of cooking fish is delicious, and a variation from the usual frying. Clean the fish, but do not scale; leave head, tail and fins intact, and put a strip of bacon in each fish. Dig a hole large enough for the fish to lie in with several inches to spare. Build a fire in it and get a good hot bed of coals. Rake out half of them, cover the remainder with an inch of grass, place the fish on the grass, cover with more grass, and pile the rest of the hot coals on top. Cover the hole with a frying pan or flat stones, or earth. The fish may be wrapped in wet paper. It requires at least two hours to cook a small fish in this way; three for a large fish, under five pounds.

FISH PLANKED

Shad, flounder, sunfish or any other flat fish may be planked. Cut off the head and tail, split open the back, but leave the belly whole so that the fish may be opened wide like a book and tacked on a plank or piece

of bark. Tack some thin slices of bacon or pork to the end of the fish that will be uppermost when before the fire and, if desired, a few slices of raw onion sprinkled with pepper and salt. Sharpen one end of the board and drive it into the ground before a bed of hot coals. Catch the drippings in a tin cup, and baste the fish occasionally until done. Oak, hickory, or alder is best for fish planks.

SMOKED HERRINGS

(1) Scald in boiling water until the skin curls up, then remove head, tail, and skin. Clean well. Put into a frying pan with a little bacon fat. Fry slowly for a few minutes. A little vinegar is an improvement. (2) Clean, remove skin, and toast on a stick over the coals.

SALMON CREAMED

Break the cooked salmon into small pieces and heat with about one-half the quantity of milk. Thicken with a little flour and water batter. Season with salt and pepper.

CRABS

Crabs are known as "soft shelled" if caught just as the old shell is shed, and "hard shelled" when the shell is mature. Crabs are in season from first of April through September. They are cooked in the shell. When cooked the back should be broken off and entrails washed out. They may either be boiled for twenty minutes in salted water or sea water without addition of more salt.

CLAMS

(1) Clams are procurable from sandy beaches at low tide. Open shell with knife and remove body, using the soft part, which is most digestible. Roll in flour and fry.

(2) Clams in shells may be placed on seaweed over live coals and baked.

(3) The necks of the long-neck clams are used as follows: Split open lengthwise; scald to remove skin and sand. Run through grinder, or chop in a bowl, and use in chowder or soups.

MUSSELS

Mussels are in season through December to May. They should be avoided if taken in water near the mouth of streams likely to be polluted with sewage. Only those which are under water all the time should be used. They are taken on the rocks at low tide. Wash well. Place very

near a hot fire, and roast until the shell opens. The fibrous part is poisonous, and only the yellow mussels should be used. This mussel is served with salt and butter, or may be ground or chopped, and used as clams in chowder or soups.

POT PIE

Fill a Dutch oven or kettle two-thirds full with fresh mutton or beef, and cook until tender. Add three or four potatoes, peeled and sliced, and two onions cut in small pieces. Return to the fire and cook until the vegetables are half done, then spread a dough over the top made of the following ingredients:

2 cups flour
4 teaspoons baking powder
½ teaspoon salt
5 tablespoons fat
Water or condensed milk to make a soft dough

Cover the kettle with a lid, heaping coals on top, and bake the pie until the crust is browned.

STEW AND DUMPLINGS

Make a stew out of the meat, remove the bones. About twenty minutes before serving add sliced potatoes and onions, and drop in by the tablespoonful a cup of soft biscuit dough. Put on the cover and boil until done. Avoid burning.

MEAT GRAVY

Take equal quantities of hot meat fat and flour, stir until well browned, and add one pint of boiling water or condensed milk to four tablespoons of flour. Cook five minutes, season with salt and pepper.

Desserts

DRIED-FRUIT SAUCE

Soak 1 cup of fruit in 3 cups of cold water for at least 2 hours; over night is better. Cook slowly until tender. Add sugar, the amount depending upon the fruit, and cook 15 or 20 minutes. Any kind of dried fruit, as loganberries, rhubarb, peaches, prunes, etc., may be used for sauce.

DRIED-APPLE JELLY

1 pound of evaporated apples.

Stew apples in 1½ quart of water, remove apples and use as sauce. There should be left 1 quart of hot juice. Into it put 1 pound of sugar (2 cups). Boil without stirring until the juice becomes sirupy and two drops fall from the side of a spoon at once. Pour into a jar or cup. This makes 1 pint of jelly.

DRIED-FRUIT PIE

Crust
1½ cup flour
¼ teaspoon salt
⅓ teaspoon baking powder
6 tablespoons fat
¼ cup water (about)

Mix flour, salt and baking powder together, rub in the fat, then add the water a little at a time until a stiff dough is formed. Avoid stirring this, as that will make it tough. Roll out, line a pan, and fill with any cooked fruit. Cover with a crust and bake.

DEEP ENGLISH PIE

1 cup flour
2 teaspoons baking powder
¼ teaspoon salt
2 tablespoons fat
2 tablespoons sugar
Enough condensed milk or water to make a soft dough

Mix the dry ingredients and rub in the fat. Then add the liquid a little at a time to form a soft dough. Drop this dough onto cooked fruit, covering completely. Bake in a reflector or oven.

FRIED FRUIT PIE OR "TURNOVER"

1 cup flour
1 tablespoon fat
1 teaspoon baking powder
¼ teaspoon salt
Liquid to make a dough as for biscuit

Mix as for biscuit and roll out ¼ inch thick. Melt 1 tablespoon of fat in a frying pan and place the pie crust in. Lay some cooked fruit on half of the crust and fold the other side over, pressing the edges together. Fry on one side until brown, and turn over, browning on the opposite side. More fat may then be added for finishing it.

FRUIT LOAF

1 cup flour
2 teaspoons baking powder
1 tablespoon sugar
¼ teaspoon salt
1 tablespoon fat
Water enough to make dough to roll out
½ cup cooked dried prunes, peaches, or apples

Make a dough of first five ingredients and roll or pat out with the hands to ½ inch in thickness. Cover with the fruit, sprinkle with sugar if not sweet enough. Roll up and bake about ½ hour, pouring over a little fruit juice.

HUNTER'S PUDDING

½ cup finely chopped salt pork (soaked overnight in water)
½ cup molasses
½ teaspoon soda
½ cup condensed milk or water
¼ cup sugar
1 ½ cup flour
½ teaspoon cinnamon
¾ cup raisins

Mix dry ingredients. Add molasses and milk to salt pork. Combine mixtures. Oil a lard pail, turn in the pudding, cover, set in a kettle of boiling water, and steam for two or three hours. Serve with the pudding sauce.

SAUCE

½ cup sugar
Pinch of salt
½ cup flour

Put the sugar in a frying pan and stir constantly until it turns a dark brown and becomes sirupy, but not burned. Just before it changes from a light brown to dark, add the flour and salt, and finish browning. Then add 2 cups water and stir until thickened.

GINGERBREAD

2 cups flour
½ cup molasses
2 tablespoons lard or bacon fat
½ cup sugar
Enough water to make a thick batter

Mix with the flour and sugar ½ teaspoon of soda and 1 teaspoon

of ginger and, if possible, a handful of raisins or dried currants. Add the molasses and water, and bake in a medium oven or reflector. (Contributed by Jay Billings, Forest Supervisor, Lakeview, Oregon.)

GINGER COOKIES

2 cups flour
½ cup fat
½ cup sugar (brown if possible)
1½ teaspoon ginger
½ cup molasses
½ teaspoon soda
1 teaspoon baking powder
½ cup water

Mix the sugar and fat, and add to this the flour and other dry ingredients, alternately with the water and molasses which have been mixed together. Roll out and cut like biscuit, or thin with a little water and drop from a spoon onto an oiled pan.

CAMP COOKIES

2 cups flour
2 tablespoons melted fat
½ cup sugar
½ teaspoon cinnamon and cloves or allspice
3 teaspoons baking powder
½ cup raisins

Mix the flour, sugar, and baking powder together, pour in the melted fat, then add the raisins and enough water to make of the consistency of baking-powder biscuit. Roll out about ½ inch thick, cut with a can and bake.

ROLLED OAT COOKIES

2 cups rolled oats
2 cups flour
½ teaspoon salt
2/3 cup sugar
1 teaspoon cinnamon

Mix all, and work into it ¾ cup butter or other fat. Dissolve 1 teaspoon soda in ¾ cup hot water. Add, and roll out, cutting with a can, or thin a little and drop from a spoon onto a greased pan.

FRITTERS

1 cup flour
¼ teaspoon salt
¾ teaspoon baking powder
3 teaspoons sugar
¼ teaspoon salt
4 teaspoons milk (condensed)
1 egg (fresh or dried)

Add milk and beaten egg to the dry ingredients. Beat well while mixing, and drop from a spoon into hot fat. Fry till brown and cooked through.

DOUGHNUTS

1 cup flour
¼ teaspoon salt
1 teaspoon baking powder
1 teaspoon melted fat
1/3 cup sugar
1 egg
Nutmeg

Mix dry ingredients. Add egg well beaten and enough milk to make a soft dough. Roll out ½ inch thick. Cut and fry in deep hot fat.

RICE PUDDING NO. 1

½ cup rice
½ teaspoon cinnamon
¼ teaspoon salt
4 tablespoons sugar
A few raisins
2 tablespoons butter if possible

Boil the rice until tender in about a pint of water to which the salt has been added. Then add the other ingredients and cook for about 15 minutes.

RICE PUDDING NO. 2

2 cups cold boiled rice
1½ cup milk
2 eggs (if possible)
½ cup raisins
½ cup sugar

Beat eggs, add the sugar, rice, etc., and bake in a pan until firm.

CAMP PUDDING

1 cup fat salt pork (cut in dice)
3 cups flour
1 cup sugar
1 cup currants or other dried fruit
2 teaspoons spices
3 teaspoons baking powder

Have ready a large kettle of boiling water and a large bag made from a flour sack. Dip the bag into boiling water, remove and dredge flour on the outside of it. Roll the pork in flour, add the other ingredients, and then enough water to make a good thick paste or batter. Turn this out into the floured cloth. Tie the bag securely. Allow room for swelling to twice its bulk. Drop into the boiling water and boil 2 hours. If the water stops boiling the pudding will be spoiled.

SAUCE FOR PUDDING

¼ cup sugar
1 cup condensed milk or water
2 tablespoons flour
1 teaspoon spice

Mix flour, spices, and sugar together and add the milk slowly, stirring until smooth. Cook until thickened. Remove from fire and, if possible, add vinegar to taste.

HUCKLEBERRY OR SALLABERRY COBBLER

Put 1½ gallon huckleberries in a stew kettle without any water. Boil 5 minutes. Pour off the juice. Prepare the dough as for Deep English Pie, using twice the recipe. Roll out about ¼ inch thick and cut a round of the dough to fit the bottom of a frying pan. Put in the pan and brown on both sides. Put in the berries about 2 inches thick. Make the upper crust large enough so it can be tucked down and connect with the bottom crust. This can be done by tilting the pan so that the berries will slide to one side of the pan. Bake in a reflector or oven. (Contributed by C. B. Reese, Foster, Oregon.)

MOLASSES CAKE

1¼ cup flour
½ cup brown sugar
½ cup molasses
2 teaspoons baking powder
¼ teaspoon cinnamon or allspice
1 tablespoon lard

Mix in same manner as the gingerbread, using about ½ cup of water, or until a medium batter is obtained. Bake in oven or reflector.

SNOWFLAKE CAKE

1/3 cup sugar
1 cup flour
¼ teaspoon vanilla
1½ tablespoon lard (or 2 tablespoons butter)
2 teaspoons baking powder
½ cup condensed milk

Mix the butter and sugar well until creamy. Add the flour, mixed with the baking powder, alternately with the liquid. Stir well and bake.

PLAIN CAKE (WITH EGGS)

½ cup fat
1 cup sugar
2 small eggs
½ cup milk (or water)
2 cups flour
2½ teaspoons baking powder
¼ teaspoon vanilla

Thoroughly mix sugar and fat. Add well-beaten eggs. Add the baking powder to the flour and mix well. Mix the flour and liquid alternately with the butter and sugar. Beat well and bake in an oiled pan. This cake may be varied by the addition of chocolate, nuts, spices, etc.

PORK CAKE

2/3 cup hot coffee
1/3 cup chopped salt pork
2 tablespoons raisins
2 tablespoons currants or cut prunes
1 teaspoon spices
2/3 cup sugar
1½ cup flour
1/3 teaspoon soda
2 teaspoons baking powder

Chop the pork fine and pour the hot coffee over it. Stir into this the flour and other ingredients, stirring thoroughly to remove lumps. Bake in an oiled pan for an hour, or steam in a lard pail for about 3 hours, covering the pail tightly.

Dried Fruit Desserts

STEAMED CARROT PUDDING

1 cup sugar
1/3 cup butter
1 cup carrots (dried)
1 cup flour
1 cup chopped raisins
1 teaspoon soda
1/3 teaspoon each allspice, cinnamon, cloves and salt
1 cup granulated potatoes (fresh potatoes may be used)

Soak carrots for 12 hours, then chop them. Soak granulated potatoes for 20 minutes. Combine ingredients in the order given and steam for 3 hours.

BAKED DRIED PEARS

Soak dried pears for 12 hours, add a few chopped nuts and a little butter; sprinkle some sugar over the top and put a little water in the pan. Bake slowly for ¾ of an hour.

DRIED-PEAR BUTTER

Soak pears for 12 hours, cut in pieces, cook in the same water (adding sugar to taste) until they have cooked to pieces and are the consistency of marmalade.

PICKLED DRIED PEARS

Soak pears for 12 hours. To six pears add ½ cup vinegar, 1 stick of cinnamon, 2 cloves, and enough brown sugar to give a good flavor. Cook about ½ hour and let stand for one day.

A BRIGAND STEAK*

By G. CLYDE FISHER

EVERY real Woodcrafter likes to cook over an open fire. It appeals to the primitive and natural impulses in one. Who would not prefer a meal cooked in this way and eaten out-of-doors to the most sumptuous repast that could be offered by the finest hotels of our cities?

Every growing Woodcrafter wants to learn to do new things.

*From *The Totem Board;* used by permission of The Woodcraft League.

Photo by Farida A. Wiley

JOHN BURROUGHS TEACHING DR. G. CLYDE FISHER HOW TO PREPARE AND COOK
A BRIGAND STEAK

Do you know how to prepare and cook a brigand steak? If you do not, I shall tell you as I was shown by John Burroughs.

First, cut one or more wands or branches, the number depending upon the size of the party. These wands should be of Sugar Maple, straight branches five or six feet long, about three-fourths of an inch in diameter at the base and tapering to the size of a lead-pencil. The bark should be removed from about two feet of the smaller end of the branch, and the tip should be sharpened. Then, take a thin steak, not more than half an inch thick, and cut it into small pieces about one and one-half inches square; slice some young onions, only partly grown—use small onions if only old ones are available; cut some bacon in thin slices. Now, string the pieces of steak, onions, and bacon upon the wand like beads on a string, putting on a piece of steak, then a slice of onion, and then a folded slice of bacon, and so on in this order until the string is eighteen inches or so in length.

Cook over an open fire. Place a stone or other support on the opposite side of the fire upon which to rest the tip of the maple branch. Then rotate this rustic spit slowly over the fire while the meat and onions are roasting.

In starting a fire in the open, Mr. Burroughs broke off, if at hand, the fine dead twigs which are always to be found upon the lower part of the trunk and upon the bases of the lower branches of the Hemlock, and used them instead of a fuzz-stick. The value of this material, which is kept dry even in pretty wet weather by the crown of the tree, may be well known, but the Hemlock did not grow where I lived as a boy, and I learned this bit of woodcraft from the Sage of Slabsides.

Mr. Burroughs says that the brigands paid no attention to smoke,—that they had not time to wait until the fire burned down to a good bed of coals. So he began to cook the steak almost as soon as the fire was started, and cooking, he says, takes all of the conceit out of an onion.

A brigand steak may be cooked in a few minutes, and it will excite any Woodcrafter's appetite. The very name appeals to the imagination and makes one hungry. It has the smell of smoke in it. Try it once, and you will surely want to try it again.

PERSONAL HEALTH, SANITATION, AND CAMP REMEDIES

By FRANK H. CHELEY

MOST folks have a very mistaken idea about what roughing it really means. Contrary to the popular idea, it does not mean that even a boy, under the guise of camping-out, should hie himself into the woods and there quite completely forget every principle of personal health and sanitation. "The question of keeping healthy in camp merits more consideration than it usually receives. Practically all sickness in camp is due to neglect which the observation of a few simple rules of hygiene would have prevented; and if campers would exercise a little more care, nearly all of the ills of camp life could be avoided."

Dogs can often live on half-cooked food bolted down in a hustle, but humans can't, and should carefully avoid even giving such living a trial. Such roughing it may be possible for a few hardy miners and lumberjacks who, through years, have seasoned themselves to it; but others who attempt it simply display the fact that they are tenderfeet. Such roughing it is no fun.

Remember, Lad or Lass, that you take your "regular" stomach camping with you, and therefore you must treat it much as you do at home, only better. It will no more stand abuse in camp than in school; yet many a summer outing is a sad failure because folks somehow get the notion that the fact that they are in the woods makes it possible for them to "eat like hogs." Every meal must be well cooked and eaten with a

relish, or else you pay for it later on. That is the reason why everybody should learn simple cooking *before* he starts camping. Eat sparingly the first few days in camp—not all you want, but all you ought to have. Look out sharply for headaches billiousness, cramps, and diarrhea. Study the sections of this book covering food and camp menus until you have mastered the principles—every one. *Be certain there is at least one good cook* among you, not by hearsay, but by demonstration; then you are ready to camp.

Take time to eat and enjoy it. Laugh at your meal—chew it thoroughly. Don't wash it down with cup after cup of strong coffee or tea. Be sure that every day's food puts you in shape for a strenuous to-morrow. Learn to cook, eat, and enjoy the simple nutritious foods, whether you eat them at home or not. If you cannot eat and enjoy such food, you are not exercising enough to make you hungry. The great secret of good camp food is to get a balanced ration. Spend a lot of time in working over a set of simple menus, suited to your markets, before you go. Follow them with care, or else because of hurry, rain, or some other thing, you will find yourself cooking the easiest things to prepare. This is a very bad camp habit. For instance, do not live on bacon simply because bacon is a camper's stand-by. Eat some meat, of course; game when you can get it, for it is wholesome and nourishing, if you do not over-eat of it. Balance your ration; see that it is properly cooked and seasoned, and eat of it in moderation. Such procedure is the basis of health in camp.

Doctors know that in the fall they have to attend to most cases of typhoid fever, many of which are the result of a run-down bodily condition, often in the case of campers who were "tough enough to stand anything." It is a fine thing to have an "iron constitution," and to be able "to eat like a grizzly bear"; but if you are that fortunate, consider it as the best part of your camp equipment, and take care of it as you would your ax or your watch.

Entirely too often camp flapjacks are fit only for sole leather, while biscuits would make good cannon balls, and camp coffee will often "float a brick." Study to be a first-rate camp cook; and if you are not to do the cooking, insist that the boy who *is* to do it be able to "feed you well."

Take time daily for care of your human machine; clean your teeth twice a day. If you lose your toothbrush, make one by fraying the end of a green willow stick. If you have lost or forgotten your tooth paste, use baking soda or salt; but don't procrastinate.

Wash your hands thoroughly, and clean your nails before working in the food. It is often very difficult to keep one's hands in any sort of shape while camping. To help, wear an old pair of soft gloves with the fingers and thumb cut back as far as the second joint. Wash in cold water and dry thoroughly. Mutton tallow is the best hand lotion. Rub the hands together until all signs of the grease are gone. Have your own towel and soap, and keep the towel clean. Cleanliness is a fine preventive; in fact, perfect cleanliness, attention to clothing, sanitary surroundings, etc., will often prevent diseases which all the "cure-alls" and other patent medicinal preparations will not cure.

When cooking over an open fire, a hat will often protect your eyes. When going through the woods and brush, avoid the back slash of limbs into your face. If your eyes smart and burn, do not rub them. Poison ivy is thus often rubbed into the eyes. Carry a bit of dry boracic acid with you. This makes a safe and effective eye-wash, and can be used generously. If you get some irritating substance in your eyes, bathe them again and again in cold water. If you must wear glasses in the camp, have an extra pair in a small wooden box, protect the ones you do wear with goggles whenever possible.

The nose, too, needs careful attention in camp. Keep your handkerchiefs clean. Breathe through your nose always. If it becomes stuffed up or irritated, snuff a weak solution of

table salt and water up the nostrils and into the mouth. Sometimes your ears will bother in camp; a drop of hot olive oil is often a great relief. Keep the ears clean, but do not dig in them with anything save a soft damp cloth.

Shave frequently (if you have any beard). Some campers "let 'em grow," but this is poor policy from both the point of comfort and sanitation. Bathe often, and do not be mistaken into believing that swimming is bathing. Have a soap bath at least twice a week. If you can do no better, take it at night, so that you can go naked into the water. Even if there is nothing but a cold running stream, select an open spot where the sun shines, and have your bath. It will increase your hiking ability by several miles a day, in addition to the pleasure and comfort of being clean. In this connection, however, it is well to remember that cold water absorbs body heat. Many a one swims away his vitality in the summer. Two swims a day, not to exceed twenty minutes each, are all any boy should indulge in for health's sake.

Get a free and copious bowel movement every day. Just after breakfast is the desirable time. A natural movement is worth a half dozen occasioned by medicine. You will need to give this matter special attention in camp. The change of food and water may upset what you believed was an established health habit. Eat plenty of dried fruit, and raisins are far better than candy. Drink plenty of water. Good water is colorless, clean, free from suspended matter, of brilliant luster, and free from smell or taste. Rain water is good, so is water melted from clear ice or clean snow. Marsh water is always bad. There is as much need of "safety first" in the matter of drinking water as there is in any other way. Avoid drinking too much water when hot and weary. Sip it slowly. Have your own drinking cup. Boil your drinking water, if there is the slightest doubt about the cleanliness.

Exercise freely. Don't let a day go by without thoroughly ridding your body of waste. Too much chocolate and other

concentrated foods cause constipation; avoid them. Eat green things whenever possible, such as water cress, greens and so forth. Wild berries are apt to cause trouble in this connection.

Get nine hours' sleep in the open, if possible. Completely change your clothes at night, and *sleep alone, if at all convenient.*

A great many campers, and especially in over-night camps, merely remove their shoes and crawl into bed without the formality of undressing. This practice should be discouraged. The clothing absorbs the perspiration, and septic poisons exuded by the skin may cause trouble. Again, after the day's activities cease, the perspiration cools and chills the body, if the clothing is not removed. Many aches, pains, and stiff joints, especially when arising, may be traced to the act of sleeping in clothing dampened by perspiration. Pajamas and nightshirts are not out of place in camp, but quite the contrary. If you have forgotten to bring a regular night garment, an extra suit of underwear will do as well. Camps in which the night is disturbed by rough houses and midnight lunches are health-killers. If you want to get the most *out* of the day, you must put *in* good nights of sound, refreshing sleep on a clean, dry bed.

Care should be taken to keep the feet warm and dry. In wet weather, waterproofed shoes should be worn, but in dry weather, un-waterproofed shoes are better. The feet need an opportunity to breathe, and they cannot, if in waterproofed shoes. Army doctors say it is better to have wet feet than to suffocate them in waterproof shoes; and that is the reason army shoes are not waterproofed; but campers who are obliged to tramp around in cold water will find it better to wear waterproofed shoes in conjunction with thick, porous socks to absorb the perspiration, than to go all day with cold, wet feet and their attendant evil, retarded circulation.

Before you start on your camping trip, have your family doctor look you over carefully, advising you relative to your

ability to stand strenuous exertion and the like. Make a record of your weight, height, and lung expansion, in order that you may measure the physical good that you gain. Camping out is primarily a physical house-cleaning, and should send you home physically improved. However, do not take that for granted; check up on it.

As a general rule, campers have little need of a physician's service. The fresh air and sunshine and freedom of camp life are better tonics than those sold in drugstores. Modern medical authorities recognize this fact, and the physician of to-day prescribes more fresh air and fewer pills in the treatment of those who are "down and out" from living the unnatural life of the present day. If you should need medical treatment, however, consult a physician. Most patent medicines contain opium or alcohol, which are usually more injurious to the body than the diseases the medicines are supposed to cure. We may be sure that if patent medicines would do all that is claimed for them, our physicians would have them and use them in their practice. *No kind of drug or medicine whose effects we do not fully understand* should be taken into the system, except upon a doctor's orders. For safe camp remedies, see page 412.

Not only take the best of care of your own self, but have an eye open constantly for anything that will help the sanitation of your camp for the benefit of your comrades, not even forgetting "those others" that may by chance follow you in the woods. Here are a few suggestions.

Don't throw food, dishwater, fish entrails and the like about in the grass. Burn or bury everything that might feed the flies.

Use only the regular latrine. Don't be a sneak. If caught too far from it, dig a slight pit *away* from the watershed and cover the matter thoroughly. Avoid fence corners, and under no circumstances use grass or leaves for toilet paper; serious poison is often gotten in this fashion.

Think constantly of the other fellow.

Bury or burn your garbage.

Burn all tin cans, papers, old clothing, rubbish and the like. Fire is an excellent disinfectant.

Keep your cooking dishes clean—run no chances.

Help in every way possible to protect water, food, and milk supply.

Simple Remedies

Toothache may be cured by applying a slice of fresh garlic to the aching member.

Make a strong solution of 3 tablespoons of baking soda in a small bottle of water; carry this for insect bites, tooth wash, or a chance sick stomach.

Common mud is good for bee-sting, but tincture of iodine is better. The latter is good for any insect bites; and in fact, it is considered the best germicide for a camper to carry.

A canteen filled with hot water, or a hot stone wrapped in a woolen shirt, makes an excellent hot-water bottle for cramps, chills and the like.

To properly open a blister, sterilize a needle (never use a pin) in strong antiseptic, boiling water, or in a fire. Thread it with clean white thread or string, and pass the needle through the blister from side to side so as to form a wick that will drain off the fluid. Clip the string so as to leave good ends at either side of the blister. Use dry powdered boracic acid generously.

Sage tea, made from the prairie or mountain sage, will very often break up a fever, and is a sure remedy for mountain fever. It is harmless, and may be used without danger.

Poison ivy, sumac, and oak are treated differently in different sections. Cardamom seeds boiled in water make an excellent lotion, and the seeds are easy to carry. Sugar of lead is an old remedy, but tincture of grindelia is more effective. If you have no remedy, wash often with a strong suds of a good medicated soap.

A half teaspoon of essence of ginger in a mouthful of hot water is a splendid thing for cramps or stomachache; is also a good stimulant for shock.

Tincture of iodine is probably the best surface antiseptic for the inevitable cuts, scratches, minor sores, severe insect bites, and the like. Dissolve the crystals in pure alcohol.

If there is indication of infection in any minor wound or abrasion, use aristal powder generously. This comes in shaker cans like talcum, and is very convenient.

For burns of all kinds, a tube or can of unguent cannot be surpassed. It will relieve severe sunburn when every other remedy fails. Don't go without it, if there is to be much swimming.

Do not use vaseline or any other substance on a freshly abrased surface. Apply it only after the scab has formed, in order to keep it soft.

Never close a fresh wound with adhesive tape or court plaster. This keeps the air out and invariably makes trouble. Adhesives are meant only to keep dressing in proper position.

Good poultices can be made in camp by spreading a thick mixture of soft soap and sugar on a rag. A bit of fresh red meat will draw surprisingly. Flax seed, of course is the old stand-by for this purpose, but corn meal or oatmeal may be made to serve. The soft inner bark of almost any tree, boiled into a paste, will make a satisfactory emergency poultice.

In case of poisoning, emetic may be made of common salt and mustard; use lukewarm water. If it does not produce results, follow it with a cup of very strong coffee.

A Camp Medicine Kit

If the party is at all large, and to be out some time, the most qualified person should be made camp doctor, and in turn made responsible for a simple outfit with which

to meet common emergencies. He should be prepared in three ways:

First: By having at hand one of the fol owing reliable books: "Backwoods Surgery and Medicine," by C. S. Moody, M.D.; "Emergencies," by Gulick, "First-Aid to the Injured," by Doty.

Second: By assimilating before going to camp enough accurate information from these books to make possible the giving of immediate relief in any emergency without having to devote time to "research and study" before the case can be attended to.

Third: By making use of all past experience in this particular field. Experience accumulates rapidly. Each new emergency should be met with growing confidence and good judgment.

He should have a regulation first-aid kit (size determined by the number in the party), and in addition a few common remedies. Likely he will prefer to make up his own outfit, and if that is the case the following list will help in a proper selection:

Drugs and Remedies

Aromatic spirits of ammonia, with rubber cork.
Essence of peppermint.
Essence of ginger.
Soda mint tablets.
¼ grain calomel tablets.
Castor oil or cascara.
Unguentine.
Small bottle pure olive oil.
Tincture of iodine.
Small bottle of oil of cloves.
Reliable remedy for diarrhea (consult doctor).
Reliable throat wash (consult doctor).
Reliable liquid disinfectant (consult doctor).
Medicated soap.

Sugar of lead crystals.

Can of good salve, and such other remedies as you are accustomed to.

Surgical Supplies

Antiseptic gauze.

Assorted roller bandages.

Absorbent cotton.

Bundle of clean cotton rags.

Several rolls adhesive plaster.

Assorted safety pins.

Assorted surgeon's needles, with catgut in sterile tubes.

Boracic acid.

Clinical thermometer.

A set of simple surgical instruments, including scalpel, scissors, tweezers, probes, artery forceps, and so forth.

POISON! DON'T TOUCH!

POISON ivy and poison sumac are indeed poison. They grow as a vine or bush in yards, fields, swamps, and along roads.

A person is poisoned by touching these plants or by touching other things which have brushed against the plants. Clothing, cats, and dogs carry poison in this way.

How the Poison Acts

The poison may act in a few hours, or not for five or more days. It begins with itching and burning, usually on the hands, arms, or face. The feet and legs of barefoot children are also in danger. The skin gets red and swells, small blisters appear, and the itching gets worse. Sometimes there is a throbbing pain, fever, and sleeplessness.

Cure for Ivy and Sumac Poison

In bad cases, get a doctor or go to a clinic as soon as possible. Don't let other people tell you about sure cures. *Do not use ointments.* They spread the poison.

VIRGINIA CREEPER
OR WOODBINE
Five Leaves

POISON IVY
Three Leaves

As long as ivy poison stays on the outside of the skin, it can be washed off. Therefore, if you think you are poisoned, wash the skin at once with kitchen or laundry soap and hot water. Make a heavy soap lather and wash four or five times with gauze. Use a new piece of gauze each time so that the poison will not spread. Change the water often or use running water. Wash only the sore or exposed parts. Repeat this after four or five hours. Careless washing without rinsing may spread the poison.

Do not scratch. Hot water will relieve the itching. Scratching spreads the poison.

Either cooking soda or Epsom salt—one or two heaping teaspoons to a cup of water—may be used to relieve inflammation. If cloths or bandages are used, they must be kept wet and changed often. Do not use tight, dry bandages; the air will help cure.

POISON or SWAMP SUMAC

If the poison has spread over the body, wash the whole body and the hair. Change the water in the bath at least twice. Wear loose clothes.

If the skin is very sore, stay in bed. Keep the room cool and use light covers. Keep the bowels free. Eat fruits and take cold drinks.

To Prevent Poisoning, Destroy the Plant

To prevent poisoning, dig the plants up, roots and all, and burn them. Take care to avoid the smoke, as it carries the poison. Be sure to use heavy gloves and overalls, which should be washed and rinsed afterward to remove all poison from them. The plants can be killed by spraying them with kerosene, or with brine (three pounds of salt to a gallon of water).

CAMP PESTS

THE enthusiastic camper, as he starts for his outing in the wilderness, should not be unmindful of the swarms of bloodthirsty flies, gnats, mosquitoes, chiggers, and numerous other common camp pests which infest the woods and hills in the summer and early autumn months, for they are always there in countless millions and lying in wait for the unprepared. These camp pests often become a source of great annoyance, to say nothing of the health-danger they occasion.

Probably the commonest members of this vast army are the flies (of which there are several kinds), the mosquito, black flies, chiggers, and ticks.

Flies

In temporary camps it is very difficult to effectively fight the flies yet it is of the utmost importance that every reasonable precaution be taken against them. Typhoid fever is one of the greatest dangers in camping, and is very often brought into camp by flies that roam the polluted spots, and finally settle upon your table just as it is spread with an inviting meal. Flies have been found to be the greatest spreaders of

this dread fever, as well as of cholera, dysentery, and even tuberculosis; and if for no other reason, should be fought at every turn. The very presence of flies is an indication of uncleanliness, insanitary conditions, and the improper disposal of substances in which they breed. They are not only annoying, but are actually dangerous to health.

In permanent camps it is a different matter—here they may be reduced to a minimum, and food as well as campers may be kept almost entirely from their dirty, germ-laden feet by a little care. Flies *can* be reduced to the minimum, if

FIGURE 1.—THE STABLE or BITING HOUSE FLY

FIGURE 2.—COMMON STABLE FLY

you will keep your camp clean and sanitary. If you do not want them, watch out, for a single pair may become the progenitors of something like twenty million other flies in the course of a six weeks' period; and at the end of a second weeks' period, if they have good luck, each pair of the first herd will have added another twenty million. So it goes. All you need for this marvelous production is a few near-by manure heaps, a dirty garbage pit, a filthy spot kept alive by daily dishwater, an open latrine and the like.

There are several varieties of flies common to camps, but all carry disease, and should be fought at all times. Farmers' Bulletin No. 851, published by the United States Department of Agriculture, describes the common varieties as

follows: The biting stable fly (Figure 1), the common stable fly (Figure 2) that is not equipped to bite, the blow or meat

FIGURE 3.—THE BLOW or MEAT FLY

FIGURE 4.—GREEN-BOTTLE FLY

FIGURE 5.—THE HOUSE FLY

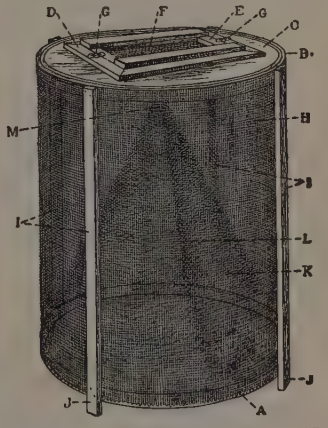


FIGURE 6.—CONICAL HOOP FLYTRAP

A = hoops forming frame at bottom; B = hoops forming frame at top; C = top of trap made of barrel head; D = strips around door; E = door frame; F = screen on door; G = buttons holding door; H = screen on outside of trap; I = strips on side of trap between hoops; J = tips of these strips projecting to form legs; K = cone; L = united edges of screen forming cone; M = aperture at apex of cone

fly (Figure 3), and the green-bottle fly (Figure 4). All breed in decaying animal matter or filth, passing quickly from the egg stage to the pupa, and then into adult flies able to create their kind in about four days.

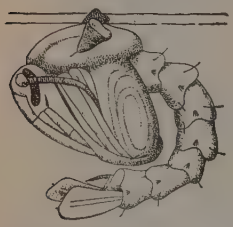
Every permanent camp, in addition to carefully screening buildings and tents, insofar as that is practicable, should use other means. Any boy can

quickly make a conical hoop flytrap as described in the government bulletin and illustrated in Figure 6. Use these about the mess tent and kitchen. (Very small, handy, all-metal traps of this type can be purchased for a few cents each.)

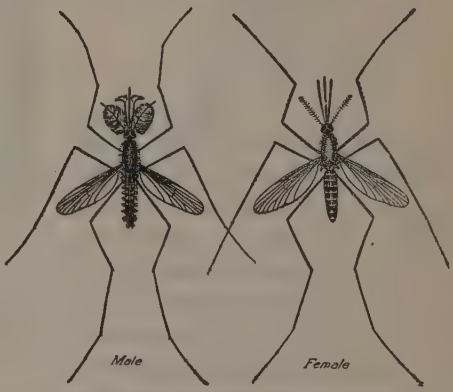
If you find sticky flypaper more usable, tack it to boards from the sides of packing cases and nail these boards fast, especially about light openings. A very effective fly poison is made by adding three teaspoons of commercial formalin to a pint of milk or sweetened water. The United States Public Health Service recommends a one per cent. solution of sodium salicylate. This is prepared by dissolving three teaspoons of the pure chemical in a pint of water and adding a bit of brown sugar. Soak blotting paper with the liquid and expose on plates and old tins.

Mosquitoes

In Farmers' Bulletin No. 444, L. O. Howard of the Department of Entomology tells us all about the "pestiferous mosquito" that likely spoils more camps and outings than all



PUPA OF THE MALARIA-BEARING MOSQUITO



ADULT MALARIA-BEARING MOSQUITO

other "out-of-door misfortunes" combined. He says:

"Mosquitoes are man's inveterate tormentors and foes. At the seaside, on the undrained prairies of the west and northwest, in the far north, by woodland pool

and mountain meadow, these bloodthirsty brigands in countless myriads waylay the individual on business or pleasure bent.

"Swamps, ponds, and marshes, however, are not the only places which breed mosquitoes. A little rain-water in an old tin can, if neglected, will supply mosquitoes in sufficient quantities, spreading discomfort, causing insomnia, and tempting to profanity.

"If mosquitoes were merely a bothersome plague there would be ample justification for unrelenting warfare against them; but when we consider that a certain kind of mosquito found especially in the South will convey yellow fever from infected to healthy persons, and that certain other kinds, by disseminating malaria, render many regions of great fertility almost uninhabitable, no argument for fighting them is necessary.

Protective Liquids

"Spirits of camphor rubbed upon the face and hands, or a few drops on the pillow at night, will keep mosquitoes away for a time, and this is also a well-known property of oil of pennyroyal. Neither of these substances is durable; that is to say, a single application will not last through the night. Oil of peppermint, lemon juice, and vinegar have all been recommended, while oil of tar has been used in regions where mosquitoes are especially abundant. Oil of citronella is one of the best substances to be used in this way. The odor is objectionable to some people, but not to many, and it is efficient in keeping away mosquitoes for several hours.

Smudges

"Anything such as green wood, grass, litter and the like will make a dense smoke, and drive away mosquitoes as long as the smudge lasts. Dalmation insect powder, as well as Persian insect powder, thrown into the fire are often very

effective. Sometimes the powder is dampened, then molded into tiny cones. These cones may be burned in the tent with safety by placing them on a tin lid or a bit of green bark.

"The smoke of smouldering birch bark will effectually drive mosquitoes from tents at night, but the smoke is offensive to many."

Remedies for Mosquito Bites

L. O. Howard also says: "The most satisfactory remedy for mosquito bites is moist soap. Wet the soap and rub generously on the puncture. The irritation will soon pass away. Others recommend household ammonia, alcohol or glycerine, iodine, or the juice of a crushed onion."

If your camp is a permanent one, cut all standing weeds in and about camp, and keep anything that might hold a bit of stagnant water, buried. If you are in the immediate neighborhood of bogs or small swamps, and can afford it, treat these places early in the spring with a generous coating of low-grade kerosene or fuel oil. Too heavy a grade of oil will not spread easily over the water, too light an oil will evaporate quickly. One ounce of oil will effectually coat fifteen square feet of water, according to government experts.

Ticks

There is an endless variety of ticks, and some one of these varieties is more than likely to thrive in your section. They are flat, thin individuals, with sharp heads, which they insist on inserting under your skin. When once they take hold they are very difficult to remove. Many times, in your efforts you will separate the head from the body of the pest. The bite often becomes inflamed and very sore, especially if the head remains under the skin. They infest old trees, especially pine, and drop upon you as you work your way through the brush or crawl upon you as you sit resting or eating your lunch on some old down-log.

A drop of hot oil on the bug will often persuade him to "back out." Alcohol is sometimes effective, if applied with absorbent cotton. Some campers remove them by lighting a match and holding it as near the "bug" as one can stand. Often when thus treated they will retreat, and can be knocked off.

LARVA OF THE TICK
A = magnified; B = natural size.

Because of their size, one can often feel them crawling about before they decide on a permanent location. In this way many are discovered and gotten rid of without harm. Keep your eyes open for them. Shake and sun your blankets thoroughly every day. Some campers mistake them for bedbugs, but the latter are darker in color.

Black Flies

"Mosquitoes are not the only vampires which infest our woods," says William H. Gibson in his "Camp Life in the Woods." "The 'punkeys' and 'midgets' can outstrip them for ferocity and the painful character of the wound which they inflict. The 'punkey,' or 'black fly,' as it is called, is a small black gnat, about the size of a garden ant, and the bite of the insect often results very seriously. The midget is a minute little creature, and is the most everlastingly sticky and exasperating pest in the catalogue of human torments. They fly in swarms of thousands, attacking face, hands, and neck. They stick where they first light, and commence operations immediately. Their bites produce great redness and swelling, and the itching is most intolerable."

BLACK-FLY, BUFFALO GNAT, or TURKEY-GNAT
Natural size = 1/6 to 1/4 inch

Such pests must be fought with dopes and head nets, as well

as with smudges and cheesecloth. Outdoor men generally have found Nessmuk's favorite fly dope very satisfactory. In "Woodcraft" he described it thus: "Take three ounces of pine tar, two ounces of castor oil or olive oil, and one ounce of pennyroyal, simmer together over a slow fire, and bottle for use."

Edward Cave suggests that it can be carried in a small flat oil-can, and that it be rubbed generously on wrists, hands, face, neck, ears, and behind them. Wash well before putting it on, and then leave it on several days at a time. Of course, wear a head net, which you can easily rig yourself. Tie your trousers about your ankles, if you are wearing low shoes or moccasins. If the pests bother you by boring through your shirt or sweater, wear a large bandanna handkerchief about your neck, doping the ends well and allowing them to hang low on the back.

A simple and not quite so offensive a dope is concocted by mixing an ounce of pennyroyal with two ounces of pure melted lard or mutton tallow.

Yet another is made by a mixture of tar and sweet oil in equal parts. Experiment, and find the one that seems best suited to your skin and condition.

CHIGGER, MITE, or RED SPIDER

Chiggers

If you have never experienced a night in camp when you lie flat on your back and desperately scratch, scratch, scratch—from head to foot and back again—you have one more camp experience coming. The "wild black and dew berries" are very tempting to a camper on a late summer afternoon, but beware! Every branch and leaf is more than likely covered with chiggers—a minute, red, spider-like pest that, once finding itself upon you, chooses a good tender location and

proceeds to "dig itself in." Then the itching begins, and lasts for days, resisting all manner of treatment.

Chiggers have a wide range, and seem to be active through the summer season. They are gotten by being about in long grass or low brush, and more often by walking through their haunts. They fasten themselves upon the trouser-leg and shoe-tops, then climb up the bare leg until they reach the garter. Very often they crawl under and camp, until one's legs have two bands of chigger bites that itch and smart like fire.

There does not seem to be an entirely satisfactory treatment. Some say kerosene oil is best. Others believe a bath of strong salt water will do the business. Others lean strongly to various prepared dopes. You must try for yourself, but the better advice is: scrupulously avoid them entirely, if possible. Chiggers, because of their persistence, are probably the worst of all camp pests, so far as personal comfort goes.

Snakes

Snakes may be properly considered a camp pest. Scarcely a book on camping and woodcraft has appeared but that has given pages to the consideration of poison snakes and how to treat snake bites. There are but four dangerously poisonous snakes in North America, and they are the rattlesnake, the cotton-mouthed moccasin, the copperhead and the coral snake. While the coral snake is a venomous snake, its bite is rarely if ever fatal.

All other snakes are harmless, and have an important part to play in nature, so should not be ruthlessly destroyed. Select your camp site, of course, where there are but few snakes, but do not stay home because of snakes. True, there are a few harrowing tales of how campers have been bitten by huge rattlers while they slept, or have found rattlers in their boots in the morning, and all that; yet probably the bulk of such instances are yarns. At a certain meeting of the National

Association of Camp Directors, representing men who had had literally hundreds of thousands of boys in summer camps, not a single man present had ever heard of a boy being bitten by a snake in which the bite had been fatal.

Certainly the bite of a venomous snake is a serious matter, and not a moment's delay in getting to a reputable physician should be tolerated. Horace Kephart in his work on "Woodcraft and Camping" says: "The rattlesnake, copperhead, and cotton-mouth are easily distinguishable from other snakes, as all three of them bear a peculiar mark, or rather a pair of marks, that no other animal possesses. The mark is a pit or deep cavity on each side of the face between the nostril and the eye, sinking into the upper jawbone."

Raymond L. Ditmar in his pamphlet on "Poisonous Snakes of the United States" says the coral snakes are found in the southern States. They are very much like harmless snakes in shape, but are easily distinguished by their remarkable colors, "broad alternating rings of red and black, the latter bordered with very narrow rings of yellow."

The rattlesnakes are readily told at once by the rattle.

But the moccasins are not so easy. There are two kinds: the water moccasin, or cotton-mouth, found in South Carolina, Georgia, Florida, Alabama, and Louisiana, and the copperhead, which is the highland, or northern moccasin, or pilot snake, found from Massachusetts to Florida and west to Illinois and Texas.

Here are distinguishing marks: The moccasins, as well as the rattlers, have on each side of the head, between the eye and nostril, a deep pit.

The pupil of the eye is an upright line, as in a cat; the harmless snakes have a round pupil.

The moccasins have a single row of plates under the tail, while the harmless snakes have a double row.

The water moccasin is dull olive, with wide black transverse bands.

The copperhead is dull hazel brown, marked across the back with dumbbells of reddish brown; the top of the head more or less coppery.

Both moccasins and rattlers have a flat triangular head, which is much wider than the thin neck; while most harmless snakes have a narrow head that shades off into the neck.

Rattlesnakes are found generally distributed over the United States, southern Ontario, southern Alberta, and Saskatchewan.

How Does a Snake Bite?

Remember, the tongue is a feeler, not a sting. The "stinging" is done by two long hollow teeth, or fangs, through which the poison is squirted into the wound.

The striking distance of a snake is about one third the creature's length, and the stroke is so swift that no creature can dodge it.

The snake can strike farthest and surest when it is ready coiled, but can strike a little way when traveling.

You cannot disarm a poisonous snake without killing it. If the fangs are removed others come quickly to take their place. In fact, a number of small, half-grown fangs are always waiting ready to be developed.

In Case of Snake Bite

First, keep cool, and remember that the bite of American snakes is seldom fatal, if the proper measures are followed.

You must act at once. Try to keep the poison from getting into the system by a tight bandage on the arm or leg (it is sure to be one or the other) just above the wound. Next, get it out of the wound by slashing the wound two or more ways with a sharp knife or razor at least as deep as the puncture. Squeeze it; wash it out with permanganate of potash dissolved in water to the color of wine. Suck it out with the lips (if you have no wounds in the mouth it will do you no harm there). Work, massage, suck, and wash to get all the poison out. After

thorough treatment to remove the venom, the ligature may be removed.

"Pack small bits of gauze into the wounds to keep them open and draining, then dress them with gauze saturated with any good antiseptic solution. Keep the dressing saturated and the wounds open for at least a week, no matter how favorable may be the symptoms."

Some people consider whisky or brandy a cure for snake bite. There is plenty of evidence that many have been killed by such remedies, and little that they have ever saved any one, except, perhaps, when the victim was losing courage, or becoming sleepy.

In any case, send as fast as you can for a doctor. He should come equipped with hypodermic syringe, tubes of anti-venomous serum, and strychnine tablets.

Some General Suggestions on Camp Pests

Eat your breakfast and get to going before the insect swarm comes to life. They are usually not very active until a warm sun is shining.

Camp, whenever possible, on a wind-swept knoll or point. This helps materially.

Keep your head and bed net mended: one tiny hole is enough to bring you misery. If the smaller of insects insist on crawling through the meshes, dope your nets.

Do not scratch insect bites. Very often such sores become infected with poison ivy or the like. Keep them clean, sterile, and doped, and they will soon get better.

Don't wash any oftener than absolutely necessary, if once well "doped." The older the dope the better the gloss, and in consequence the more sure the protection.

Don't forget your fly dope. A small reserve supply is often a good thing.

CANOE CRUISING AND CAMPING *

By FREDERICK K. VREELAND

THERE is something about canoe cruising that is different from any other kind of camping. In the first place, there is the zest of uncertainty, not knowing just where your next camp will be, or what will appear around the next bend of the river. Then there is the problem of navigating, picking difficult channels, or running rapids, or studying the wind conditions on a lake to find the easiest going. Then there is the choosing of the camp site at night, selecting a spot which is high and dry, with lots of wood and with shelter from the wind or weather. But best of all is the intimate contact the canoe cruiser gets with Mother Nature. The canoe is the Indian's boat, and somehow it almost makes a fellow feel like an Indian when he grasps his paddle and shoves off. A boy in a canoe sees things that he cannot see in any other way. The canoe glides so quietly that one can creep up close to the wild creatures and study them at close range, or he can lie concealed in overhanging bushes like a bit of the landscape, while the birds and animals live their lives around him. And after all, it is the making friends with the little outdoor people that is the best part of camping.

Of course, the ideal place for canoe cruising is in the big woods; but not every boy lives in a region where he can get into the wilderness without too long a journey. But there are very few boys, at least in the Eastern States, who cannot find some water near home that is fit for cruising. Of course, a river is ideal, for you can travel on and on with something

* By courtesy of *Boy's Life*, the Boy Scout magazine.

new each day. In some regions where there are no real rivers, there are lakes. For boys living near the sea there are bays, and inlets, and creeks that offer all sorts of opportunities. Even a canal offers possibilities for an interesting cruise if you cannot get anything better. You will be surprised at the chances for exploration near at home, if you have ever really looked into it. Half the fun of a canoe cruise is to find out some place that the other fellow has not discovered and explore it for yourself.

Outfitting

Outfitting for a canoe cruise is different in many ways from preparation for ordinary camping. In a fixed camp you do not have to consider weight, and can bring along all the junk you like. For a back-packing trip, on the other hand, the outfit has to be cut down to the last ounce, or life becomes a burden. The canoe hiking outfit lies between these extremes. The chief point is to have everything portable, to provide a tent that is quickly pitched and taken down, and to have the outfit conveniently packed so it can be easily handled and not littered all over the boat like a rat's nest.

The Canoe

Of course, the first thing is the choice of a canoe. That depends entirely upon the nature of the water, the length of the trip, and whether or not the outfit has to be carried over portages.

The original canoe was made by the Indians of birch bark, and a good birch canoe is hard to beat for lightness and clean running, provided it is carefully handled and kept dry. But a birch canoe is easily damaged, and once it is allowed to leak and become waterlogged, it loses its lightness and buoyancy.

For hard service in the wilderness there is nothing equal to the canvas-covered canoe, made over a light but strong white cedar frame. These can be bought from a number of standard

makers, and will stand an amazing amount of punishment. This type is almost a necessity where the water is shallow and the canoe is likely to bump frequently on rocks. If the canvas is cut the leak is easily mended, and it takes a very hard blow to break the wooden sheathing under the canvas.

But, for ordinary service, such as most boys will have, a home-made canoe is plenty good enough for all practical purposes, and every boy who has the right stuff in him will take an especial pride in making his own canoe. I know a summer camp of boys which has a fleet of twenty canoes, every one built by the boys themselves. The frame is made with a flat wooden keel with stem and stern pieces screwed on, ribs of barrel staves are attached to the keel and held together by longitudinal strips of bent wood, and a canvas cover is tightly stretched over all and carefully painted. Of course, you cannot use a canoe of this type for ramming submarines unless you want to become a diver, and I wouldn't recommend it for running bad rapids or traveling shallow, stony streams; but for lakes and fairly deep rivers it is quite satisfactory. I know a man who traveled 1,200 miles on the rivers of Northwestern Canada in a 12-foot folding canvas boat.

The size of the canoe should be carefully considered. The standard canoe for grown men in wilderness cruising is 18 feet long, and about 34 inches beam, and 12 inches depth amidships. Such a canoe will carry three months' provisions for two men besides all the camp outfit. But this is too heavy for boys of average size to carry easily. The 16-foot size is much better for older boys on long trips, while a 14-foot, or even a 12-foot canoe, if made 30 inches wide and well modeled so as not to be too cranky, is big enough for a two weeks' trip.

Be careful in selecting paddles. The stern paddle should reach your chin as you stand on the ground, and should have a good broad blade, which takes a firm hold on the water without wasting energy in eddies and splashing. The bow paddle should be about 3 inches shorter.

Tents

The chief point in selecting a tent is to get one that is quickly pitched and taken down, for when you are traveling and making a new camp every night there is no time to be wasted in fussing. A pyramid tent has great advantages, for all you have to do is to peg down the four corners, tie the peak rope to a pair of sheer poles and raise the poles, one on each side of the tent, until it is drawn taut. An "A" tent is almost as easy to pitch, especially if it is hung on a ridge rope tied between two trees. A type that I like better yet is pitched like an "A" tent, but with a sloping ridge rope or ridge pole, making the front higher than the rear, thus having most of the advantages of a lean-to or baker tent without the difficulty of pitching.

The ordinary wall tent is probably the least desirable of all, because it needs so many pegs and guy ropes.

Do not forget to have a mosquito bar sewed in the front opening, and hanging loose enough for you to lift it and go under.

The Cooking Kit

The cooking outfit should be carefully chosen for convenience in packing. A miscellaneous lot of kettles and pans littered about the canoe is a nuisance. The different kettles (and there should be at least three or four) should be of different sizes so that they will nest one inside of the other, and the cups, which are conical and made so that they too will nest, go inside of the smallest kettle. A bread mixing pan fits around the bottom of the largest kettle. A cover of canvas or fiber is made to fit the largest kettle, with room enough on top to put in the plates and the frying pan (with a detachable handle), and the knives, forks, and spoons are stuck in around the edges. I have an outfit for four men which goes in a hard fiber case 12 inches in diameter by 14 deep. My outfit is made of aluminum, which is cheapest in the long run because

BOYS IN THEIR HOME-MADE CANOE

it lasts forever if carefully handled; but for the ordinary purposes tin pails which have lapped and not soldered joints are plenty good enough.

The Grub Outfit

The provisions should be very carefully chosen to give a good balanced diet without too much bulk or weight. Canned goods are a nuisance and are quite unnecessary, except for a few cans of milk. The staples are: Flour, corn meal, oatmeal, rice, beans, sugar, salt, baking powder, bacon, raisins, and evaporated fruit. The fruit is not a luxury but a very important item, for it is hard to keep healthy when living entirely on concentrated food. Evaporated peaches and evaporated apples stewed together make a sauce that will make your mouth water. The flour and corn meal are mixed to make johnnie-cake, which is cooked in a reflecting baker, or baked into bannocks in the frying pan; the rice boiled with raisins is an excellent supper dish; the beans are boiled over the evening camp fire with chunks of bacon rind to be ready for breakfast, and every boy knows what to do with the bacon. With this outfit, using plenty of beans and corn meal, one can get along very well without meat, though of course fresh meat is desirable, if it can be had, and any canoe scout who can't catch fish deserves to go hungry.

The packing of the provisions is the most important thing of all; for while a boy never expects to be upset he is always prepared for emergencies, and rain will fall on the best regulated outfits. All the provisions therefore should be packed in waterproof canvas bags. My favorite method is to put each article in a separate bag securely tied at the mouth, and pack these bags in larger bags of waterproof canvas, 9 inches in diameter by 24 inches long, arranged with a neck that can be tied tightly so that water will not leak in. The small bags are made of just the right diameter to fit inside the larger bags, one on top of the other, and can be made by the boy, of ordi-

nary strong muslin, dipped in melted paraffin, which makes them waterproof.

One of the large canvas bags will hold 30 to 35 pounds of provisions, which will last two boys for eight or nine days.

Loading the Canoe

Properly stowing the outfit in the canoe is a high art; and you can always judge the experience of a cruiser by the way his duffel is packed.

The first thing is to distribute the load so that the canoe will run properly. The heavy things, provisions, etc., should be flat on the bottom with the weight just far enough aft of the middle to make the bow ride an inch or so higher than the stern. The lighter things, bedding, etc., can be placed on top. The cooking kit should be placed so that you can get at it for lunch without disturbing the rest of the outfit. The whole should be covered with a waterproof tarpaulin, which is lashed on with ropes stretched across the thwarts. Be sure that your ax is wedged in with the duffel so that it will not cut anything, and will not fall out if you upset.

Loading the outfit loosely and carelessly into the canoe is a sure sign of a duffer. I remember reading an article by a well known writer on exploration, telling how he lost his ax, his gun, and the greater part of his provisions in an upset in the wilderness, and describing the hardships that resulted as if he had done something heroic, instead of feeling foolish for not seeing that his outfit was properly packed.

I have had only one cruising upset in my life and in that case the canoe rolled over and over in the swift water of the Big Salmon River in British Columbia, but all I lost was my camera tripod and the cover of the porridge kettle. This was due to my own carelessness, for the kettle was left out, as it should not have been, with some cold oatmeal from breakfast.

Portaging

Another test of a canoe cruiser's experience lies in the way he handles a portage. On nearly every stream there are places where the canoe has to be taken out and carried. You can always tell a duffer by the way he goes over the portage with kettles and frying pans and all sorts of junk dangling around his knees.

If your outfit is properly packed it is a very simple matter to strap one or more bundles together with a pack strap or tump-line, sling it over your back, take an ax or a fishing rod in your hands and walk over the trail. *Do not* try to carry a load in your hands or arms. That is a sign of the rankest amateur.

To carry a canoe is a good deal of an art. A wilderness *voyageur* almost always carries the canoe alone, sometimes using a wooden yoke made for the purpose to fit his shoulders, but more often making a yoke by lashing the two paddles to the thwarts, side by side, just far enough apart to let his head between and in just the right position to balance the canoe properly upside down with the nose in the air. For boys, however, a canoe is usually too heavy to carry alone. In that case the two boys should take it together, one going ahead with the paddles, lashed to the front thwart, resting on his shoulders, the other following behind with his head in the peak between the gunwales. In this way a long portage can be made very easily.

Patching Leaks

Always go prepared with material for stopping leaks. A leaky canoe spoils everything, including your temper. Even the worst leaks are easily stopped with a little care. The best material is the "marine glue" made for the purpose, which is like a very sticky black pitch. Thick white lead is better than nothing, and spruce gum melted with tallow can be used in a pinch.

If the leak is small, simply warm the spot with a candle flame and smear on the pitch with the heated blade of your knife. Be sure to dry the spot thoroughly with the flame before applying the pitch.

If the hole is large take your knife and cut a slit clean through the canvas, then cut a piece of clean canvas an inch larger all around than the slit, and work it with your knife between the canvas cover and the planking. Then with the candle work melted pitch all around, sticking the patch firmly to the canvas, and tack down the edges of the cut with copper tacks. A patch made in this way will be absolutely tight and almost as strong as the original covering.

The Camp Routine

When you are traveling you and your partner should plan a strict division of labor, so that each knows exactly what he is expected to do and does it promptly and efficiently.

Do not delay too long in making camp. You should land at least an hour before sundown to allow plenty of time to make a comfortable camp. There is no excuse for spending a restless night and being tired the next day when a little forethought would avoid it.

Choose a camp site on a bank high enough to be dry, where the tent can be pitched without spending too much time in clearing. On landing the bowman is responsible for tying the canoe so that it will be sure not to get away. Then both together unload that part of the outfit that is needed at once. One boy takes his ax and starts to cut wood. The second takes the hatchet and the tent; clears the ground, cuts the tent poles and pegs and pitches camp. When he has done this he finishes unloading the canoe, carrying up the bedding and provisions, and turning the canoe upside down on the shore where it will dry until morning. Meanwhile the first boy has cut enough wood to start the fire and got the kettle boiling. If he understands his job he will have supper ready by the time his partner

has got things snugged up for the night. Then there should be enough daylight left to cut the wood needed for the evening camp fire.

If this is done there is nothing left to be done after supper but wash the dishes and enjoy life.

In the morning the routine is reversed. While the cook is getting breakfast his partner is knocking down the tent and stowing the duffel so that they are ready to push off as soon as the dishes are washed and the cooking kit packed.

I think by this time every boy who did not know it already will realize that canoe cruising is the greatest thing he ever tried for developing all his faculties of woodcraft, efficiency, and resourcefulness. The best part of it is that there are no two camps alike, and each day brings new problems to try your wits and to test your preparedness. Do not hesitate, but choose your bunkie, get out your maps, and plan the cruise now.

CAMPING WITH A BICYCLE

By FRANK H. CHELEY

SINCE the advent of the automobile, the bicycle has been steadily declining in favor among adults, but not so with boys. The humble "bike" is still very popular among them, as evidenced by the "miles" of racks provided for them about every school building in the land. The bicycle is the average boy's "Ford," and is an ideal vehicle for certain kinds of camping. It has numerous advantages over "shank's mare," if you are to follow roads, in that it is faster and very convenient for carrying a medium-weight pack. It is also superior to a pack animal for a good road's trip, because it does not have to be fed, watered, or tethered out at night. Of course, it does have to be pumped up, and have its tires repaired now and then; but that is a simple matter, and not to be

compared with hunting up grassy meadows after dark for feed, or carefully weighing the pack sacks each morning so they will ride well, to say nothing of all the time or patience necessary to properly throw the elusive diamond hitch.

Pack animals are all right for trips deep into the mountains, where one must go cross-country, or climb over slippery needle-padded trails, but pack animals are fearfully expensive, and extremely difficult to manage, unless you are a "sure enough veteran."

Pack animals for the wilderness places, canoes for the long winding rivers, "shank's mare" for the go-light hiking trips, but for covering the country where you can combine camping with travel, the bicycle is the thing for the average boy.

Of course, it would be very poor policy for a lazy boy to start camping with a bicycle, for it involves many long hours of genuine labor. Perhaps you would as leave stand up and walk, as sit down and walk; if so there is no one to object. Despite the laborious nature of a journey upon a bicycle, such a camping trip has many advantages that cannot be denied. There is something leisurely and intimate about such a trip. You are never in too much of a hurry to stop and enjoy the view or any pretty performance on the part of the numerous wild folk you are bound to meet; and if you are friendly and keep your eyes open, indeed every good view is an excuse to get off and rest. Undoubtedly it is about as convenient and satisfactory a way to spend a few days off in an inexpensive and enjoyable fashion as there is.

The problem of camping out with a bicycle resolves itself into three parts: First, a selection for outfit which shall combine the minimum of weight with the maximum of utility; second, the choice of suitable companions, which probably is the most important consideration of all; and third, the choice of a suitable locality in which to take your journey.

Of your equipment, likely the most important consideration will be your wheel itself. If should be in first-class running

order. You will find it worth while to thoroughly clean and oil it before starting. Be sure that the rims are "trued" up, the tires in good shape, and the adjustment of bearings satisfactory. The wheel itself should not exceed twenty-five pounds in weight. It should be equipped with a simple luggage carrier, preferably one that is rigged over the rear wheel. This is a light, steel shelf, bolted to the frame back of the seat, and supported to the rear axle. Any bicycle dealer will have them. There should be a handy tool kit, with all necessary wrenches and tire repairs, pumps, and oil, including a generous roll of new tire tape. The wheel should be equipped with a reliable coaster brake, a good carbide lamp, broad uprising handle bars, and a comfortable spring saddle. The saddle is of great importance, for it is to a bicycle trip what proper fitting and comfortable shoes are to a hiking trip.

Keep your personal kit down to the absolute minimum. The length of your trip, will, of course, have a great deal to do with what you finally include. But, for instance, do not carry with you a lot of extra and unnecessary clothing. If you must have it, ship it by parcel post to some point along the way. At that point, make your change, and send back the discarded clothing. Go light—buy as much of your food as possible along the way. You will likely be making a town or two a day. This plan is much more satisfactory than lugging grub with you from the start.

Tents are too heavy and bulky for such a trip. Leave them at home, unless you have a small balloon silk shelter, that is light weight and compact. It is much better for each boy in the party to equip himself with a large poncho, at least 66 by 90 inches. Let the party pair off and arrange the ponchos so that two may be quickly tied together into a shelter cloth. This may be easily pitched at a steep angle, and with a fire properly arranged in front, will serve all purposes and give enough protection from the weather, and comfort at night.

Be sure to rig your army blanket with tapes, as described in

Figure 41 of the section on "General Party Equipment." Such a blanket carefully rolled inside your poncho will not exceed nine pounds in weight, and can very conveniently be fastened to the luggage carrier. Pack what simple clothing and toilet articles you may need in a small duffel bag and strap it next to your blanket roll. Tie your woolen sweater over these two bundles, so that you can get at it easily and quickly, for you will want it on likely when you stop for any length of time. Riding will make you very warm, and you will protect yourself from colds by cooling slowly in a sweater or coat. Never throw yourself down on the ground while hot with exertion. If you do, you will soon find yourself weary, stiff, and useless for hard riding. Cool off slowly every time.

Do not carry a load on your handle bars, unless absolutely necessary. It makes guiding difficult. Leave your steerage as free as possible. Carry a small, comfortable knapsack. It may be either the pack variety, or the sort that slips over the shoulder. In your knapsack place your simple cooking kit, and such food as you are to carry with you. Always keep an emergency ration with you, for you may not get to the next town when you expect to, and pedaling up hill and down dale on an empty stomach, perhaps in a storm, is far from satisfactory.

A bit of sliced bacon, sugar, pepper, salt, coffee, cocoa, or tea, and a small can of milk, one of beans, along with a piece of rye bread, should always be in the pack. Even a potato or two does not come in amiss, or an extra cake of sweet chocolate, for that matter. Add to these a regular hiking bill of fare which can be procured at almost any cross-roads grocery store, and you have a sufficient commissary. If stores are few and far between, buy from farmers, ranchers, or settlers, and be prepared to pay for such accommodation in the coin of the realm.

Never go without a bit of fishing tackle tucked away in a convenient corner. Many a tiny brook will yield up a fish

or two for the evening meal that will help the commissary immensely.

If drinking-water is scarce, you must, of course, carry a canteen. Fill it at every chance, and in case you find yourself drinking too much water, use lemonade tablets, which may be secured at any drugstore. Keep your eyes open along the way for vegetables, fruit, and berries.

Take time to eat and sleep. What is the hurry? It isn't likely that you are out to break any speed records; so enjoy yourself on the way. Take a whole day or two to camp and loaf when you find the right spot. These are the times to use your kodak to best advantage. You will more than make up for lost time in the long run. Bathe, eat, sleep, sit by the fire and dream big dreams. Explore many inviting, shade-cooled dells. Associate with the birds and flowers—that is the way to go camping with a bicycle. Lie often under the trees, and look into the sky above; absorb a bit of the peace and quiet of the out-of-doors. Every long, hard pull up a steep hill will be rewarded by a wonderful coast down the other side, drawn by the good steed, Gravity. Oh, what a delicious experience it is to slip, down, down a ribbon of road in the first blush of a new day, or while nature is painting her evening sunsets! The coast down makes every pull up eminently worth while. The high points have their magnificient views, but the valleys have their bubbling streams, and cool, shady resting-places.

Be certain you have a workable ax, plenty of matches, and a few simple remedies for sunburn, snake bites and the like, and your note-book. You will need most of them every day, probably many times a day, and there is nothing like being prepared, even on a bicycle camp.

Don't be fooled into believing that you can go on a bicycle camping trip successfully with just anyone though, for it "can't be did." The choice of your companion is only of second importance to your choice of a wheel. He must be tried true—a real fellow. Everybody knows what sort of a

boy that is. The kind that can smile when he gets a flat tire. The kind that can tow a fellow camper in distress, ten miles if necessary, and call it fun, even when his own legs ache and his head throbs. The kind that is willing to fish a while, if fishing is the common choice, or swim, or pick berries. A fellow whose motto is always "the other fellow first." Choose a comrade who will enjoy getting into camp late so that everything must be done by the flickering flare of the bicycle lamps, or a fellow who will think it's great sport to rise at 3 A.M. in order to get up the long hill for a glorious sunrise. Choose him carefully, I say, with all these things in mind. You want a happy, resourceful, unselfish, chummy sort of a "pardner." Any other sort predestines your trip to failure. When companions are well chosen, it is doubtful if there *is* any other way in the world whereby two congenial boys can have a better time than by camping together with their bicycles. Incidentally, bicycle camping is a great stunt for a father and son. If you don't believe it, try it this summer.

Now, having gotten your equipment and your "pardner" settled, the next thing is to determine where to go. Lay out a definite route on a map. Select country that has passable roads, for pushing a loaded bicycle up long rough hills, or through mile after mile of soft sand, is slavish labor. It would be far easier to carry all the pack on your back. With the tremendous increase of good roads and with every road, good, bad, and indifferent, properly mapped out, with a little care and inquiry a wise selection may be made. Avoid going in the wet season and also avoid the hot, dry days of midsummer. Late spring or fall is the best season for most sections.

Choose a route that has supply depots at reasonable distances. If you want to really get out into the wilds, ride to the nearest point and pack into the wilderness as far as you care to go. Some such little side trips add greatly to the journey always.

In any event, having chosen your route, supply yourself with adequate maps of the country. The regular automobile maps are excellent, but the topographical sheets published by the Geological Survey at Washington are far better. Each of these sheets covers an area of approximately thirteen by nineteen miles, and may be bought for a few cents. They show all the roads, streams, towns, and so forth, and also—a matter of decided interest to the rider—the location and heights of all hills and mountains. The sheets are marked off into nine rectangular parts, and by cutting these parts on these lines and pasting them carefully on a piece of muslin, leaving a small space between all edges, you have a desirable map that will fold up and fit easily into your pocket.

Get an early start—take it easy—camp two hours before dark. Make a good bed. Enjoy every meal, and enjoy the friendly road. Such a trip will cost you little more than it would to stay at home; and like any other camping trip, will pay large dividends on the capital invested.

CAMPING ON THE BEACH *

By A. F. WESTEVELT

THE beauty of camping, to me, is its never-the-sameness—never are two camps exactly alike, never are two locations in every way the same, and never are conditions similar.

For the mountain camp certain equipment would prove excellent, while for a trip to the burning summer sands of the Atlantic seaboard, considerable alterations in the duffel would have to be made. This for the simple reason that conditions are entirely different—it all depends where one intends to go and what one intends to do when arrived.

Let us consider the problems of a trip to some place on the

* By courtesy of *Boy's Life*, the Boy Scout magazine.

Jersey shore, the equipment to be carried by pack and the object surf-fishing.

At first thought, a go-light equipment seems necessary, as a pack trip on the beach means hiking through deep sand, which is more tiring than snow, with the added discomfort of summer heat.

For shelter, a very light one-man tent should be carried, light but very strong and waterproof. Many such tents may be found in the sporting-goods houses, but their cost, in these times of high prices, is prohibitive to most of us. However, a very good tent may be made of unbleached muslin dyed green —the front a triangle, 4 feet on each of the three sides, the rear end another triangle 2 feet on a side. The ground plan will be 6 feet long, 4 feet wide in front, and 2 feet wide in the rear. Sew in a mosquito net front, as the Jersey "skeets" descend in swarms at nightfall.

Such a shelter will not cost over $3.00 and will not exceed three pounds in weight. It will need but two poles to set it up—one 4 or 5 feet for the front and a 3-foot one in the rear.

A tent that can be set up with short poles *must* be selected, as very few stakes of any great length are to be found on the beach; in the woods it is different; cut all you need.

A light three-pound blanket will do for summer; but to keep out the frosty air of autumn, a five-pound army blanket or light all-wool sleeping bag will be none too warm. Pull on an extra pair of warm wool socks if cold; however, if the feet are warm and comfortable the rest of the body usually will be.

For stake cutting and tent pin driving, a light, good quality steel belt-ax is the proper thing—although a heavy-backed hunting knife will do on a pinch. Mosquitoes and flies being numerous on the beach, the tent *must* have a mosquito front—make it long and loose so that you can crawl under it, and then tuck the bottom under the edge of the tent.

A head net, too, will add greatly to one's comfort and may be made easily by constructing a cylinder of netting or scrim

about 2½ feet long and large enough to slip over head and shoulders. Draw the top together with a draw or pucker string, slip over the head and tuck the bottom into your jacket. The visor of your cap or hat will keep it from the face, and you may laugh at the mosquitoes and at your less fortunate companions. Also provide yourself with a pair of 10-cent cotton gloves, which may be used, also, at the fire when handling hot pans or sticks.

Blowing sand is another hardship on the beach; driven by a heavy wind it cuts like sleet, covers up everything not taken care of and sifts into every conceivable nook and cranny. The tent, therefore, must be put up strongly and staked down with care, the sod cloth carefully packed down with sand; if the wind shifts to the front, drive a couple of stakes into the sand to support a wide board on edge to keep out the flying particles.

To avoid sanding everything in the tent, it is better not to lie on the sand, soft as it may seem the first night. It is far better to make a bed of dry sea-grass that you will find rolled up by the sea at high-water mark. Spread this out in the sun, and at bedtime you will have a mattress not to be beaten by the best on the market. Not only will this be more comfortable, but the sand that drips from shoes and out of them on entering will sift down through the grass and not get into and all over your blanket. Lay a few boards in front of the tent for the same reason and knock your shoes off on them before retiring.

Never lay a thing down on the sand if you expect to see it again; moreover, it is dangerous. I nearly cut my fingers off on a sharp ax that had become sanded over.

On arriving at the camp site, put all the duffel on a log or box and immediately build a table, rack, or something to keep the outfit up out of the sand.

You will find trouble, too, at the cook fire with blowing sand—but build a wind-break or board fence on the windward

side of the fire and that will help a lot, although at times sand simply *will* find its way into things. Lids on every cooking thing on the beach is another rule to be observed.

As to fuel for the fire, one has little choice of woods—all is sun-dried or water-logged. Avoid very punky stuff, however, or wood with too much resin in it.

Have all hands at odd times bring up wood of any kind for the big heap that will be fired at night to illuminate the beach for the night fishing, which, by the way, is the best. Of course, there is no fresh water on the beach, so it is best to camp within easy distance of a Coast Guard Station, where the kitchen pump is available to any one knowing the ropes. Greet the Captain courteously, be a gentleman and don't slop water all over his clean kitchen floor and he will be glad to see you, ask you to come again and probably visit you at dusk to see if you are all shipshape and comfortable.

Use any old clothes that are wool; plenty of wettings in the surf will occur, but if wool is next the skin no chilling will result. Take a sweater for cool evenings, a poncho or light raincoat, extra underclothes and wool socks, bathing suit if needed, and extra sneaks or slippers.

For cooking, lightness again comes to the fore—no need for many pots and pans—a "scout kit" meets all the requirements, although the "stopple kit" is useful as it has a little folding grate and two fry-pans or plates that may be clamped together to form a baker. However, a knife, fork, and spoon, cup and pail, fry-pan, dish, and bowl can be obtained very cheap.

As miscellaneous necessities, you need toilet kit, canvas bucket, medicine kit, a lantern, either the folding kind with candles or a carbide lamp, and a tin of carbide, matches, soap and towels, camera and films, a ditty bag with its assorted odds and ends, such as safety pins, needles and thread, nails, knife, tire tape, flashlight, and what not. In mine I think I could find enough to build a house. A little wall pocket,

made of brown denim, is a handy trick to have along; support it by two stakes in the tent and put in all your small stuff, toilet articles, etc.

To carry all this, some kind of a pack must be provided or else a duffel bag; as a duffel bag to my mind is unwieldy, a pack is used in all my trips.

For the fishing you will need a stout, two-handed rod, wood or split bamboo, but husky enough to stand the strain demanded in sending a four-ounce sinker some hundred feet out into the briny. The real thing, of course, in surf rods, is what is called the spring butt rod—this consists of a six-foot split bamboo tip with agate guides and tip end, and a butt or hand grasp part of about thirty inches—the idea is that the long springy butt will assist in the cast, and it does—casts of 200 to 250 feet being the regular thing among the *good* ones.

A reel that will hold at least 900 feet of No. 12 cuttyhunk line is needed—the best reels being provided with a "throw off" or switch on the side that disengages the gears during the cast and thus adds to distance. Take some three-way swivels, four-ounce pyramid sinkers and heavy salt-water snelled hooks from 6–0 to 8–0 in size. A rod-rest or belt with a socket for the lower end of the rod to rest in and a fish knife will about complete your actual needs.

To rig your rod in the approved manner, fix your reel in place and run your line through the guides and out through the tip. Tie your line to a three-way swivel—to another arm of the three-way—attach the hook, and to the remaining arm tie a six-inch piece of line to which the four-ounce sinker is fastened. Get a cheap saw-backed knife for scaling fish and cutting bait. As to bait, get some squid or cuttlefish, cut off and save the head, slit up his "tummy," pull out the bone, peel off his reddish brown skin and cut into triangular pieces about three inches long and one inch wide, pack in a friction top tin with plenty of salt, and you will have all the

bait you need aside from the clams and fish that you may get at the beach.

Possibly the most important part of the trip is "the eats"—this is a theme in itself, and chapters may be written on this interesting subject—but let me emphasize one point—do not eat too much fried stuff; if you do, sooner or later headaches and indigestion will surely show up. Try fish-chowder, steamed clams, planked fish, boiled rice and raisins, corn meal mush, creamed potatoes, boiled onions, prunes, and apricots.

MOTORING SONG *

By C. WILES HALLOCK

WHO'S for a hike to the hills?
Who's for the wind in the wold?
Autumn is sighing—Summer is dying
Russet and scarlet and gold!
Morn is a murmur of thrills
'Wakening echoes afar!
Gay leaves are falling—wild winds are calling—
Who's for the Road and the Car?

Who's for the chill of the dawn
Steeped in a shimmering haze?
Skimming the highway, straight for the skyway,
Who's for a camp and a blaze?
Night's misty curtains withdrawn,
Greeting the pale morning star,
Daybreak is glowing—scud-drifts are blowing—
Who's for the Road and the Car?

Who's for the dusk in the pines?
Night and the hush creeping down,
Firelight dancing—Oh, how entrancing
Twinkle the lights of the town!

* Reprinted from *A. O. P. A. Magazine*, Denver, Colo., by permission.

Ho! for the hill-gusts a-whine,
Chill in the still of the dark!
Autumn is calling—singing—enthralling!
Ho! for the Road and a lark!

CAMPING WITH AN AUTOMOBILE

By FRANK H. CHELEY

CAMPING with a motor is a comparatively new development of the camping-out idea, but promises soon to head the list of popular choice, for it has many advantages that, combined, make such camping by all odds the sort for a family outing. With the tremendous improvement in roads, and the increased popularity, as well as splendid performance, of the moderate-cost car, automobile camping has suddenly become a practical possibility for numberless families, east, west, south, and north; for almost any section of the country affords attractive and altogether satisfactory camp country easily accessible with a motor.

In addition to being able to get the whole family there and back again with convenience, it offers opportunity for short trips or long trips; to permanent camps or for "gipsying" through the land. You may go spring, summer, autumn, or all three, if you desire. The cost is reasonable, varying, of course, somewhat with the section. The necessary equipment is not large; and oh, what a series of adventures, all the way from patching an inner tube by the light of a camp fire in some lonely wilderness, to stopping the car long enough to shoot *at* a bear. Note, I said *at* a bear; but after all, that is almost as much fun as killing the brute.

For real adventures, crowding one upon another, just go camping with an auto!

Yet such camping, after all has been said and done, is not

any different from any other sort of camping; so that if you are already experienced in the art of "getting ready," in the art of "going light but right," in the art of "building a proper fire" and "managing a simple grub list," to the entire satisfaction of a capricious set of appetites, you are eligible for the membership in the ever increasing horde of automobile campers that annually get far back into remote and out-of-the-way places—places where a few years ago only the back-packer and professional trapper ventured to go. Mountain wildernesses, deserts, inland lakes, and trout streams are all a possibility, if you but know how, and have the real courage of an adventurer.

Touring with a motor, however, is not even distantly related to camping with an auto. One party goes dressed up to the best wayside hotels, or from resort to resort, buying everything that is done for them, even to applying the pressure gauge to their tires; while the other carries the "best hotel" with them, pitching it where and when fancy strikes them, and glorying in the comfort of khaki, high boots, and a favorite old hat. Then with the aid of a few choice bits of "squaw wood," a side of fragrant bacon, and a can of good coffee, along with all the "et ceteras" that belong to a camp commissary, they proceed to smooth it in delightful fashion in rough places. For as Nessmuk says: "We do not go to the woods to rough it; we go to smooth it. We get it rough enough in town. But let us live the simple, natural life in the woods, and leave all frills behind."

The interesting thing about auto-camping is that no two parties go in just the same fashion. There is even a wider diversification of equipment possible than in any other type of camping. The absolutely essential thing that needs attention by all, however, is to *think through thoroughly* and in detail all the phases of the proposed trip.

Likely, first will be the party itself. As in no other type of camping, the party must be a congenial one—every member a thoroughly good sportsman. Use a fine-meshed screen in the

sifting, and if there is a single individual that might upset the joyous tranquillity of the party, by grumbling about the food, water, or beds; about the weather, the roads; the scenery, or the driver, *leave him at home;* send him to a summer hotel or resort, but as you value a good time do not compromise. Some one has well said that "Camping has two purposes: to make us acquainted with our own souls, and to renew our acquaintance with each other. To camp badly is to frustrate both."

Successful family camping *is* a fine art, and can only possibly be a joyous success when all the party are "valiant spirits."

Use great care, of course, in selecting your route. Maps issued by the Government and leading automobile clubs; logs prepared by supply and accessory houses, are important, but not sufficient. Gather other information from all available sources. Sift these facts until you have a clear understanding not only of physical conditions, but of the social, health and weather conditions of the proposed trip. Many auto-camping parties now make their own maps from available information, plotting one likely day's driving to a map, and locating each possible supply station, camp grounds, and watering point carefully upon them. Do not be ambitious to cover ground. Take it easy and enjoy every mile. You will be entirely independent of everybody and everything, so follow the leadings of the Red Gods, and camp leisurely. If you are a speed demon, seek out nice paved boulevards and "go to it," but don't fool yourself into believing that you are camping. Camping is the quiet, easy, simple life, with strain and tension left at home.

Next in importance is the car itself. The medium-weight touring car is best—five to seven passenger. Runabouts are too light, and space too limited. If the party is large, two medium cars are far better than one large one. The car should, of course, be in first-class repair. Tires should be such as will stand hard and unexpected usage, with, of course, two

good "spares" and an extra tube or so. Have the carbon out, the valves ground, and the brake linings renewed, if they are thin.

By all means, equip yourself with a first-class spot-light and a detachable trouble-light. Give the car as thorough an examination as you get for life insurance. *Don't overlook anything.* Be certain you have a complete tool kit and a generous ditty bag of extra screws, nuts, small bolts, washers, gaskets, rubber hose connections, rim bolts, cotter pins and the like. Don't forget a good supply of rags and a can of good hand soap. Include emergency vulcanizing outfit, of course, and be certain that you have a serviceable jack, pump, and tow-line. A reliable fire extinguisher is a wise investment. Your experience with your own car will tell you what you need *especially* to look out for.

Be sure to have an extra supply of water, gas, and oil. Take no chances. Never go on such a trip without at least a simple first-aid kit and a few of the good reliable remedies for the common ailments. If your trip is to be in sparsely settled country, a pocket telephone that may be attached to the farmer's wire fence telephone system may save you great trouble if you *should* have a breakdown or find yourself securely lodged in a treacherous mud-hole. You might even need a doctor—or an undertaker (luck forbid); but such things have occurred, and why not be prepared. As some one has truly said: "Auto-camping, like all true sport, has a delightful degree of uncertainty."

Do not overload your car. Many an auto-camping party make themselves ridiculous by the looks of the poor car on such a trip. You may see them with everything attached, from iron bedsteads to washtubs and packing boxes. Limit the actual weight of each member's duffel. Think through ways to reduce the weight and bulk of your equipment, in addition to placing it to best advantage on the car. Consult auto equipment catalogues for ideas; watch how others do it.

Invent a few wrinkles of your own. Make every nook and cranny inside your car do duty. If you find, because of the length of the proposed trip, or the size of the party, more equipment is necessary than can be nicely packed on the running boards and bumper, use a trailer. Make one, or buy one that fits your pocketbook. Canoe campers and pack campers have reduced equipment to a science. The auto-camper can do likewise if he will. Don't look like a moving second-hand store just because you have been too lazy and unresourceful to reduce weight and bulk. If necessary to have dress-up clothes at the end of your journey, ship a steamer trunk for that purpose.

No need to carry a grocery store with you, either, when you are making fifty miles every day or two. Carry only emergency rations, dry stuff, and knickknacks; purchase the rest as you go, or for a day or two in advance, from wayside stores, from farmers and the like.

Organize your party, each with definite responsibilities. An equitable division of labor is essential to progress and happiness. Have a "cook" and an assistant. Have a "chief mechanic" who will look after oil, gas, and repairs, keeping accurate expense account for the benefit of your next trip. Have one party responsible (with assistance of course) for erecting camp, supplying the necessary fuel and water, and for re-packing the car. "A place for everything and everything in place," is absolutely necessary. In this connection, distribute your load carefully—not by bulk but by actual weight—including your passengers. This is of utmost importance for rough travel.

Stop early enough in the afternoon so as to make a thoroughly comfortable camp by dark. Build your fire well away from your car, and if the ground is covered with inflammable litter, either rake it away from under your car or wet it thoroughly. Inflammable litter, grease drippings, and fire are a fatal combination.

If you have chosen a tent that pitches independent of the car, place it first and unpack your duffel into it, if there are signs of bad weather. If you use a lean-to as a part of the car, place your car, not the tent, into the wind. Keep your beds and bedding always dry. The pneumatic beds are best for both bulk and comfort, if you can afford them; if not, use a serviceable folding cot, unless you are where browse is plentiful. (Such places are becoming fewer and fewer—better not count too much upon them.) If you have room, a small fly to cook under, lounge under and so forth, will be appreciated, and can be used as a ground cloth for the tent, if you wish it. Probably you will rig some sort of a folding table, using one running board for seats, and supplying simple folding camp chairs for the balance. A hammock is a luxury that takes little room and gives one a good place to rest. Keep a sharp three-quarters ax handy, encased in a leather sheath, and strap an auto shovel securely to your running gear.

Remember that invariably when auto-campers become cross, crabbed, and unsociable, they are very likely "road weary." Stop, camp, and rest until "cheer" and "good will" again take up their abode with you. A worn-out disposition is much more serious than a "blow-out" or a "burned brake band." By all means, stop and "fix it." Only by so doing will you all reach home enthusiastic about each other and your modern adventure.

Study all of this volume on "Woodcraft and Camping;" then for a check-list of personal belongings, equipment, and party outfit, turn back and re-study the lists given on page 324. For a list of provisions and recipes, turn to page 351. In fact, take this, and the other volumes of NATURE AND OUTDOOR LIFE with you. They will be useful very many times. They are full of helpful suggestions.

Riding day after day will in all probability become tiresome. Take time to fish, hunt, and hike. Five days a week are plenty to travel; use the other two to rest, exercise, and in

tinkering up your car and equipment. Don't procrastinate on squeaks and rattles. Find them and fix them, and thus save a breakdown or a repair bill.

Be friendly on the road; leave clean camps, practice common decency, and remember others follow you. Never pass a party on the road that are in trouble without at least proffering help—you may be the debtor yourself another day.

Go forth a greenhorn camper if you must, but return a thoroughbred, having learned the art of living with nature by actual experience. On such the Red Gods smile.

CAMPING IN THE WINTER

By FRANK H. CHELEY

"BUT camping is for summertime," I hear you object. "You cannot swim, or fish, or hike in winter; besides, all the wild things have disappeared, and—"

Never was there a greater mistake. One of the most attractive places in all the world is a snug little shanty in the deep woods in real winter.

"It may be all right for trappers and Eskimos," you say, skeptically, "but for average folks it sounds ridiculous."

Yet there is no more reason why any average boy should not camp in winter as well as in summer, if he will prepare in the same thorough manner, and use a bit of ingenuity and common sense. As a real matter of fact, if I have to choose between black flies, midges, mosquitoes, and all the pests of the summer, and the apparent problem of warmth and comfort in winter, I would most times choose the winter. To be sure, comfortable camping in winter, no less than in summer, is dependent upon a few simple fundamentals, some of which will bear repetition here, because of their special importance in this connection.

Beyond a doubt clothing is a matter of prime importance. Here again you need to remind yourself that "no matter how warm and dry you are, cotton is always cold and wet, and no matter how cold and wet you are, woolen is always warm and dry." The only real difference between clothing yourself properly for summer camping and clothing yourself properly for winter camping, is that you need twice or three times as much of the same thing—woolen underwear, woolen shirts, pajamas, socks, woolen trousers, sweater, and knitted cap. Put on as many separate layers as the actual cold demands; watching out carefully for the danger of too much pressure from tight-fitting clothes that may impede the normal circulation and lay you open to freezing. In this connection, one needs specially to watch the feet. Preferably, wear light, fine, all-wool hose next the skin, then a pair, and if necessary two pairs, of heavy wool hose over these. This demands roomy shoes or oil packs, but insures warm, dry feet, which often are the real secret of being comfortable in winter woods. If you are to snowshoe considerable, the wool, felt-lined arctics, worn by the north woods lumberjack, are light, durable, and warm, and preferred by some winter campers to the regular moccasin.

For general clothing, probably mackinaw cloth is the best in the long run, for it is soft and warm, and will turn a considerable amount of water. (Some prefer the light, windproof leather jacket, with mackinaw sleeves.) A knitted woolen toque makes the best headgear, as it may be easily pulled over the ears and worn at night to advantage. Select neutral colors. If much tramping or snowshoeing is to be done over the snow, a serviceable pair of amber glasses will give the eyes great comfort—in fact are almost necessary if your headgear has no visor, merely as a protection from the excessive glare. Snow-blinding is painful and often serious, and entirely unnecessary.

Most winter campers camp at a permanent cabin, perhaps

Photo by Edwin Levick, New York

HIKING IN THE WINTER WOODS

in the summer log camp itself; and in such cases, beds and bedding, in fact all the whole matter of general equipment, is cared for. Probably, for the average person, a good, log cabin with fireplace or stove should be considered essential to a winter camp, at least until he learns thoroughly how to camp in winter. However, *it is* entirely possible to make yourself comfortable in the winter woods with a tent or lean-to as shelter, or even with nothing but a shelter tent, for a brief period of days. Winter pack trips are not for novices, at least in a country of much snow and zero weather. It is fairly fine art at that, to handle yourself and a simple *personal* kit satisfactorily in snow-filled woods, without attempting to carry shelter of any kind save a good blanket. Therefore, if at all possible, plan to enjoy your winter camp in a good log shack or shanty.

Food in general for winter camps should be selected for its heat-giving qualities as well as its filling quantities. Incidentally, it will take a third to a half more grub for a given party than in summer. Winter campers will likely plan on at least a certain amount of simple hunting, so that meat will supply a good bulk of the ration. Avoid canned stuff that will burst when frozen, and be sure to include the necessaries for plenty of hot soup, stews, and drinks. There will be, of course, staples for hot cereal, bread, corn bread, pancakes and the like, as well as for rice, raisins, a general assortment of dried fruit, and sufficient bacon for drippings, seasoning, and emergency. Beans of all kinds are excellent winter rations, and should be given a large place in the commissary. Canned jam would seem to be a luxury, but in winter camps becomes a necessity, because of the sugar with its heat-producing qualities. Do not stint your menu. "Dress warmly, sleep dryly, and eat plenty," is an old woodsman's recipe for a successful winter camp, declaring that under such circumstances the cold stimulates the entire being, often even developing an undreamed of amount of vitality and vigor. Under such

conditions one quickly adjusts himself to prolonged and even intense cold.

If it is necessary to pack your equipment and food to your camp over the snow, use pack-horses or burros. If these are not available, construct a simple toboggan, and by means of a long rope or cross poles, let the party pull it in themselves. This is far better than attempting to carry it in by personal pack. Better, of course, is to plan enough in advance, so as to get at least the main part of your equipment in the cabin before snow-fall, thus necessitating the carrying of only your personal effects, with perhaps your gun, pocket ax, and snowshoes as extras.

It may be necessary to camp out one night en route to join your cabin. If you should encounter much snow, choose a level, clear spot in a thick clump of trees, in close proximity to dry firewood trees. Dig out the snow, if deep, using your snowshoe as a snow shovel. Pitch camp facing at right angles to the wind. "If it is stormy, bank your shelter with old logs, brush, or some of all these. If faced directly away from the wind, the eddy formed by the tent will suck the smoke back into the camp."

If, on the other hand, you have bare ground, be sure to build a fire on the spot you have chosen for your bed, allowing it to burn an hour, then rake away the embers, cover with a few select pine boughs, your poncho on top of them and then your sleeping bag or blankets. Remember that the wind invariably blows up a ravine or draw, and that the high ground is much more likely to be dry, and therefore warmer.

In winter camping you may select a camp site irrespective of water supply, as plenty of good water may be made easily by melting ice or snow. The main things to look out for are shelter, good wood, and material for a good bed.

If there is too much snow, so that getting down to the ground can only be accomplished by an excessive amount of hard labor, build a platform of small green logs for your fire and

tramp down a place for your bed with your snowshoes, placing an extra large covering of boughs on top of the snow. Pitch the tent so as to catch all the fire heat possible, and save the largest of your wood for the night fire, building a green log reflector for it if possible. Heat your canteens and use them as hot-water bottles if you strike an excessively cold night.

If snowshoeing is to consume even a reasonable portion of your time, you should see to it that you are fairly adept at that art before venturing on a long winter camp, for as a writer in *Outing* has so well said, "To enjoy such a winter outing you must know how to walk correctly on snowshoes. Your heels *must* come up first, because the tails of the shoes won't let you lift your toes first, and you will then lift the toes of the shoes high enough to clear the snow as instinctively as you would step over a log. It is well to remember, however, that if a fall is to come, it is better to let go and fall easily into the soft snow without straining. This is likely to happen over a soft spot, where a slim bush underneath has prevented packing, or around the bases of young evergreens, whose snow-buried branches give way beneath the shoes. Get up slowly and circumspectly, like some wise old skidding horse who knows better than to thrash around in such yielding medium. It's fun to watch the other fellow when he does all this, more so when he isn't wise, and throws snow around him like a harpooned whale."

If you do camp in winter, be sure not to fall into the common rut of merely sticking your nose out-of-doors long enough each day to secure wood and water, or to empty ashes. Enjoy the jolly friendship hours about the big, congenial fireplace certainly—but do that by night—meals over, cabin put to rights. Don the necessary clothing, and explore the woods and hills—what a marvelous wonderland it is in its white robe! What views there are on every side! Try your skill at trailing the innumerable tracks in the snow. Who can

tell but that you may locate a herd of deer in their winter quarters, or perhaps a moose, or a herd of mountain sheep? Take the kodak along. Look up the birds that are wintering with you. Hunt up a half-frozen waterfall and listen to its half-drowned music. Put a feast of bread crumbs and a few bits of meat suet in your pocket and spread them on some accessible snow-white tablecloth for the birds. How they will thank you! Play the strenuous winter games such as fox and geese, dog and deer, and hare and hounds. Learn to become expert in the use of your ax. Cut and get in logs for improvements on the cabin, or for the building of indoor furniture. Perhaps you can fish through the ice, or even try your hand at trapping. Stay out-of-doors just as much as possible in order that you may keep a keen appetite, and sleep well, and enjoy the lazy fire after the sun has settled out of sight. Take in a couple of your best book friends for reading by the fire. It is an especially good time to delve into a book of fine poetry or a biography. Take time to sit and think and be friendly.

Many of the finest recollections of my boyhood are centered about a crude little shanty well back in the hills, with the snow-hung roof and long frozen trails. I can hear the merry ring of the sharp ax in pitch pine. I can smell the slowly-curling fragrant smoke. I can see the bowl of steaming soup, and my mouth waters in spite of me. The old black kettle hanging on the crane, the little circle of firelight faces and the stories. Those were wonderful days, full of the purest of joys, and not to be compared with even the summer camp days.

Comparatively few folks ever really experience the wonders of the winter woods, because they have never investigated. Go once; and forever afterward, if your circumstances will permit you, winter as well as summer will find you camping out, at least for a few days.

ANIMAL PACKING

By DILLON WALLACE

ABOUT the pleasantest way to travel and see the country leisurely and intimately is on horseback, or, as may be preferred, on foot, with an animal to carry one's pack.

The animal may be a horse, a mule, or a burro, depending upon the trail to be traveled, and other circumstances. If the trail is not too rugged, and is well watered, with plenty of good forage by the way, the horse is more tractable, and is a much better traveling companion than either the mule or the burro.

For heavy loads in a rough country, the mule is the best of all. The burro, however, is cheap, eats little, and is not particular about his food, and can travel longer without water than either the horse or the mule. He can carry nearly as heavy a load as a horse, but not nearly so much as a mule. He is a stubborn little beast, though. When he has done what he considers an adequate day's work he stops. There is no use in urging or arguing with him. He has had enough for one day, and he knows it, and that is the end of it. But if one is hiking, the burro's day is usually quite long enough.

While the Government has adopted the aparejo as its pack saddle, the cross-tree or sawbuck is the best one for ordinary

use. The former had its origin in Africa. The Moors took it to Spain, and the Spaniards brought it to America. The latter came from Asia, and is of exceedingly ancient origin. This is the pack saddle of the prospector, cowboy, and forest ranger.

The packing that we shall consider here will be with the cross-tree type. The pack saddle should fit the animal, and it should be equipped with breeching and breast strap, or if it has no breast strap if should have a double cinch. This is to prevent the saddle and load from shifting and galling the animal.

The most convenient method of packing is with kyaks. These are usually from twenty to twenty-four inches long, depending upon the size of the animal, twenty inches deep, and ten inches wide. They are better if made of cowhide, but will do well enough if made of heavy canvas, with edges and corners reinforced with leather. Each kyak should be fitted with two heavy leather straps, with an adjustable loop at the top of each strap to drop over the protruding ends of the cross-tree forward and rear, to support it in position on the saddle. These straps should be attached to the kyak with leather "keepers," riveted or sewn into place, so that the straps will not work off the ends of the kyak, but may be removed from it if desired by pulling them through the keepers. There are, of course, to be two kyaks for each animal, one for each side.

At least three thicknesses of heavy woolen blanket should be used as padding under the pack saddle. This should fall low enough over the sides of the animal to prevent chafing by the kyaks.

Food, clothing, and perhaps some bedding may be carried in the kyaks, but the best place to pack bedding is on top of the load. Cooking utensils, snugly packed in a bag, are best carried on top of the load and between the tops of the kyaks. Over this spread the bedding, and cover the whole with a waterproof pack cloth.

Great care must be observed in balancing the load. It should be no heavier on one side than on the other, else the animal's back will be galled. This is the first and most important rule to be observed in animal packing.

To lash the load into place a half-inch lash or lair rope not less than thirty-three feet, but preferably forty feet, in length is necessary. We must also have a good broad cinch with a ring on one end and a cinch hook on the other end. This is attached to the rope by passing an end of the rope through the ring and knotting it firmly. Now we are prepared to "throw the hitch" that will hold the pack in position.

The army uses the diamond hitch, but this requires two men, and is not adapted to the cross-tree saddle. There are several near-diamonds and other styles of hitches, but the most practical for general purposes is the cross-tree, sometimes called the "squaw" hitch. Even with this, "old-timers" have their individual "kinks," and are sometimes quite touchy about them. They are all good. I shall describe the hitch as I learned it from an Arizona cowboy, and as I have used it successfully over thousands of miles of trail.

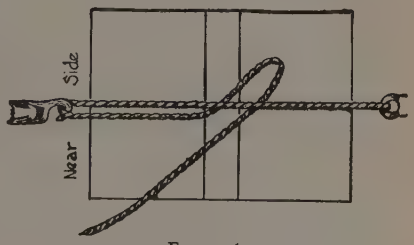


FIGURE 1

Standing on the near side of the animal, throw the cinch, which is attached to the rope, over the horse's back in such manner that the rope will fall over the center of the pack. Holding the rope in the right hand, reach under the horse and pick up the hook in the left, and engage the hook over the rope, pulling up all slack until the cinch rests evenly against the animal's belly.

The rope over the pack is called the standing rope, the disengaged rope in the right hand the running rope. Grasp the running and standing ropes above the hook in the left hand

to hold the slack, and with the right hand double the running rope and thrust the doubled portion under the standing rope near the top of the pack from rear forward, as shown in Figure 1. Draw through sufficient slack rope in the loop of the bight to pass over and around the off-side kyak.

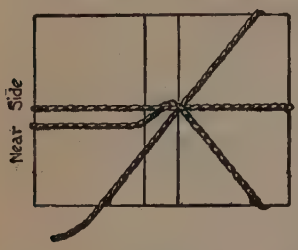


FIGURE 2

Go now to the off side, and turning the loop over engage it from front to rear around the ends and bottom of the kyak. (Figure 2.)

Step again to the near side and pass the loose end of the rope around the forward end, bottom and rear of the near side kyak. From top down pass the end of the rope around the running rope in the rear, where it was thrust under the standing rope to form the loop and take up slack. (Figure 3.)

Now the hitch must be tightened, for it is quite as important to have a properly tightened hitch as a properly balanced load. Grasp the running rope just above the cinch hook, and pull it as tight as your strength will permit. Hold the slack by taking the running and standing ropes in the left hand just above the hook while with the right hand reach to the top of the load, and where the running rope passes under the standing rope pull up the slack. Now step around to the off side and following the rope around the kyak on that side take up all slack. Hold the slack, return to the near side, and take up the slack there. Finally, grasping the end of the rope in both hands, and with a foot against the pack as a brace, draw it as tight as possible and tie.

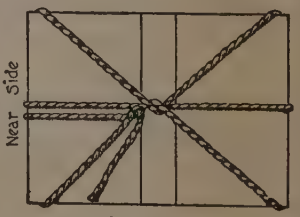


FIGURE 3

This is a one-man hitch, though with a man to assist on

PACKED AND READY FOR THE TRAIL

CAREFULLY WEIGHING EACH PACK BAG FOR THE SAKE OF BALANCE

the off side the novice, until he gets the hang of it, will have better success.

(Note—The army diamond and several other hitches are described in detail in "Packing and Portaging," by Dillon Wallace, published by the Macmillan Company).

EMERGENCY CAMPS *

By OLIVER KEMP

Author of "Wilderness Homes," etc. Illustrated with Drawings by the Author

How to Provide Shelter With Nothing but a Knife or Ax, or Even Without Them

WOODS travel under any circumstances has more of "roughing" in it than most of us desire, and those who go most often to the forest or the trail seek for all the means possible to eliminate this feature. We have with us still the camper who disdains to seek shelter from the storm, who boasts that his bed is the good brown earth, and who regales us with tales of physical discomforts endured as though the achievement of hardships was the badge of woodcraft. The problem is not to test the endurance of our bodies, but rather to find how nearly comfortable and safe our wits, backed by a knowledge of woodcraft, can make us, and for comfort we depend mainly upon two things, food and shelter.

In proportion as a camper approaches skillfulness in supplying these wants does he show his fitness for the woods. Then if the emergency arise, the prospect of staying over night away from the home camp has no terrors. Your woodsman simply proceeds to gather from the material about him the means of making a shelter and goes about the building of it

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in a manner that is calculated to give the utmost comfort, beginning early enough in the day to assure this. If the weather be fine or warm it becomes a question largely of bed making, but when snow, rain, and ice enter the problem it is not so simple.

In such a case he must save himself as much work as possible. Seek, therefore, for a wind-break; the face of a cliff, the trunk of a fallen tree, a large rock, and if none of these offer themselves, spend no time in looking them up, but proceed to build one, after the ground has been put in the best shape your limited time will allow.

It is at this point that the question arises: have you a stout knife or pocket ax? If you have, things will go along quite merrily, otherwise they must still go along and we *can* do without either.

Do not try to clear too large a space, and in your effort to remove projecting sharp stones, bushes, etc., conserve your strength to the utmost. Find a stout sapling with which to dig and pry, or by winding the branches of a particularly stubborn bush about the pole you can make it give up with comparative ease.

Batter off the tips of the little hillocks of earth and make the ground as smooth as possible. If it is raining, your very next problem is a fire, particularly if you should chance to be without blankets. This fire is to be built on your cleared space to dry the earth and warm it as much as possible.

Fire in the rain? It is no joke, though the story books make it seem comparatively easy. However, it can be done. By the way, *have you any dry matches?* No? Then we must fall back on one of two expedients, and frankly I believe you will fall back, but if you should possess a gun or revolver try drawing the bullets or shot and inserting loosely frayed pieces of cotton garment into which some powder has been distributed, then fire the gun at some convenient tree and the rags will likely be blazing.

Before this, however, prepare your kindling and wood and to keep it dry in the interval put your coat over it tent fashion.

At the bottom there is to be birch bark if possible. Failing in this, look for a dead soft wood tree and strip the bark to get at the dry wood underneath. Small splinters are needed. Get as many as possible. They can be battered off with a sharp rock (the more battering they get the easier they will burn), especially from the inside of a hollow tree. For the rest of the fire gather as much small stuff as possible from the

SNOW SHELTER AND FIRE

The snow banks over the shelter from behind and the fire reflects in from the front

underside of fallen trees and down-stuff. Whatever may have been lying on the ground is probably useless.

After the fire is under way, build up in tepee fashion other larger sticks whose chief object will be to keep off some of the rain. It should be borne in mind that a fire absolutely requires *air* to keep it going. It must therefore be built with the idea that a draft should be created that will draw from the bottom and upward through the fire. If you have any choice, build your fire with a backing of rock or against the base of a tree so that the wind from the lake or opening may blow into it.

Some of us have not learned the trick of lighting a match in the wind. The proposition is to face the wind, making a cup of the hands, and if you will strike the match and quickly get it in position with its head to the rear the chances are that the flame will catch and run up.

With the safety matches, by sliding the box three-fourths

out of its covering and shielding the whole box with the hands, the match is almost sure to burn if the flame end is pushed into the cavity. Matches that are damp can often be made to light after rubbing through the hair.

The story of the flint and steel and the rubbing sticks is a fine one for the fireside and leisure moments, but for the man who has *not* struggled with them until he has mastered the knack, the process will only afford him entertainment during the storm. But life is only a struggle for the unattainable, after

SIDE VIEW OF SHELTER AND FIRE

all, so why not try in the absence of fire? Incidentally, *it is criminal carelessness for anyone to go into the woods without plenty of matches in a waterproof box.*

A good wind-break may be made by driving two stakes in the ground and piling against these such fallen stuff as may be at hand and chinking it on the windward side with whatever leaves, etc., may offer. If rocks enough are at hand, construct your wind-break of these, and in such an event we might even turn the corners at the foot and head. This wall need not be over two feet high. Move your fire along to warm a new spot.

Bring a number of saplings and lean them against the wall so that they will project over the bed at an angle and anchor

their bottom ends either with a heavy log or rocks, etc. Sheets of bark may now be shingled on these poles and kept in place by other poles laid on top. Browse may be used if the bark is not obtainable, but it should be laid on with care with all the needles pointing downward to aid in shedding the water. It will not be dry and will leak, but it is a protection.

Oftentimes whole sheets of moss may be stripped from large rocks, and if this is used one can be fairly dry. The weight of this, however, may require a long sapling under the outer ends of the roof poles supported by a couple of crotched saplings.

Move your fire to a point about four feet in front of the lean-to, and then rustle material to keep it going, always remembering that you cannot have too much. In order not to lose more of the heat than necessary, pile some logs up for a reflector, or if stakes can be driven use these for supports and pile some saplings or driftwood behind the fire and plaster all the front of it with mud. This will throw all the glow and heat into the camp.

Get together whatever wood you conveniently can, and if there are long poles place their butts on the fire radiating from the center, hitching them forward as they burn away, always remembering that any fire needs material to climb on, so be sure to interlock them one above the other.

It may be that you are in a country where browse may be had by stripping from the low branches. If this is so, switch them well to shake off all the water possible and shingle them on the floor for a couch. Save out two or three specially large ones as a shield from the heat should the fire make a sudden start after renewal.

Be sure to take off all clothing and wring it out as dry as possible. Put this on again, and you will be less liable to take cold and be able to warm yourself much more quickly.

Now you are ready to turn in and make the best of a bad situation.

If there is no rain or snow, the matter of a night camp is quite simple. One requires a log merely or a heap of rocks for a wind-break, and he will sleep lengthwise with it after taking precautions to heap leaves, etc., on the opposite side to make sure that there will be no draft beneath. The fire will be built as before and moved along until the ground and wind-break have been warmed, thereafter drawing the fire out to its permanent position. A bed of browse for softness will keep one warm and fairly comfortable through a very cold night.

Should your night bivouac be in snow that is fairly deep, your camp may be easily built. Simply dig down to the ground, using your hands if snowshoes or other implements do not offer. This is slow work, of course, but don't be ambitious to make too large a space, and keep it triangular in form. Build up the snow on the one side where you will lie and if more snow threatens turn the corners as supports for a roof. Throw in your browse for a bed and put this in shape, then look up some poles to lay over you for a roof. Slant these so that the heat may be caught, baker fashion, and on top of these more browse and a good sprinkling of snow.

Now build your fire at the apex of the triangle. With wood enough for the fire there will be no danger of freezing.

We all like to pride ourselves upon our ability as woodsmen to find our way out, yet so simple a thing as a fog may shut in upon us unexpectedly or a heavy snowstorm may blot out trail and landscape completely and we are helpless. Whatever the cause may be, however, that keeps us over night, it is a comfortable feeling to have with us a heavy knife, a pocket ax, and some matches. With these we are ready for a small campaign, and the matter of going into camp is much simplified.

A small evergreen tree may be selected and cut partially through about four or five feet from the ground. When it falls, the butt-end will remain fastened to the stump. Cut away all the limbs and branches on the inside close to the

trunk, leaving a pleasant bower into which to crawl. Also cut off the upstanding limbs on the outside, or partially sever them to make them fall as part of the roof. Use all the material cut from the inside for the roof to make the brush camp draft tight and add more from other trees as needed.

After all, the affair of making an emergency camp is a matter of common sense. We want a shelter that will protect us from the wind and as far as possible from the rain, constructed well enough so that the wind will not blow it down.

BRUSH CAMP

All that is necessary is to cut away the branches on the down side, nearest the butt

There is to be something beneath us of a yielding nature to keep us from the bare earth, and the fire is to be placed where its glow and warmth will reach us and cheer our souls for whatever problem may confront us with the coming day.

The Canoe as a Shelter

The occasion may arise when the canoe is to be used as a shelter. Then, while there may have always lurked, away back in one's mind, the notion that simply turning it on one side and propping the other with a forked stick did the trick,

a little wrangling with the thing at the time you need it most will quickly convince you that the outfit was deliberately planned to keep you out in the cold and wet.

No matter how you twist and turn or place it, the thwarts (or cross-pieces) seem always to be in the way, and for the first time, perhaps, you realize how very narrow a canoe is.

As a wind-break the affair can be put together reasonably quickly by planting two crotched sticks of large enough diameter to sustain the weight of one side of the canoe and the pressure of the wind against it. Then, by piling moss or

A CANOE AS AN EMERGENCY SHELTER

damp leaves, etc., on the outside where the gunwale touches the ground, it will answer fairly well.

But this will not prevent your getting wet if it should chance to be raining. The solution of the problem is to consider the canoe as a *roof* only, and the important point is to get resting-places for the two ends when the canoe is turned over.

If you are fortunate enough to find rocks or logs at hand for this purpose, much time will be saved in going into camp. Otherwise proper supports will have to be made and of sufficient height to permit of your resting as comfortably as possible under the circumstances, say two feet of clearance above the brush flooring. Avoid rocks if possible, as they

FURTHER SUGGESTIONS FOR BUILDING EMERGENCY SHELTERS WHERE POLES AND BROWSE ARE PLENTIFUL

are hard to handle, and, unless flat ones can be had, are difficult to lay firmly enough to afford a bearing free from teetering.

The simplest and quickest way to make use of rocks is to build up a couple of piles far enough apart to admit the width of the bow and stern of the inverted canoe, and lay a stout stick across on which to rest your "roof."

If the ground is soft enough, it is a simple matter to force crotched sticks into the ground, using these to support the cross-pieces, or if it be rocky or the earth too hard to admit of this procedure, a good support can be hastily constructed of forked sticks as shown in the illustration. They should slant from the ground toward the canoe in order to overcome any tendency of the affair to sway sideways and so bring on disaster.

If there is much of a wind blowing and the canoe is not well sheltered, it can be anchored by bending one or two convenient saplings across it and weighting the branches with rocks or securing them in some other convenient manner. Let the end of the canoe toward the wind be slightly lower, to encourage the water as much as possible to run off that way instead of dripping down the sides. Have the affair point nearly into the wind to offer as little resistance as possible, and, of course, aid in keeping the rain from beating under through the wind-break along the side.

Gather a number of small sticks which may be pushed into the ground at an angle along one side and around the windward end of the canoe, the upper ends of the sticks resting against it. Against these sticks pile your brush and leaves for a wind-break and anchor them with dead limbs, stones, etc.

Build your fire, and while it is under way gather the material for your floor or bed. And this should be switched if wet, to remove as much water as possible and receive an extra drying over the fire before being spread beneath the canoe. Hollow the bed slightly in the middle as a prevention against

rolling out into the rain. Coarse, dead branches as a foundation, laid carefully, will help to keep you farther from the damp ground.

If you have selected a site facing a large leaning tree or rock, your fire will be protected somewhat, with the added advantage of securing the extra reflected heat.

Lay the paddles with the grips in the bows and the blades resting on the thwarts, adding a stick or two if necessary to get a better flooring, and in the space thus obtained, a considerable portion of your dunnage may be safely stowed away. This will, of course, be the low end of the canoe, as you will want as much room above your head as possible for a breathing space. In these quarters a night may be passed or a sudden storm weathered with tolerable comfort—particularly if you are able to supply the ever-friendly fire with sufficient fuel.

THINGS EVERY ONE SHOULD KNOW ABOUT CAMPING

(Selected from a Camper's Note-book)

IT IS folly to try to get a whole summer's tan in one day. Season yourself slowly. Blistered hands and feet perhaps show "pep," but poor judgment. Take it easy the first few days, and the last few days will also be enjoyable. Harden yourself by degrees.

Old log cabins or lean-to shanties are more than likely "inhabited" before you get there. Better sleep outdoors, rather than get bedbugs in your clean blankets. No use trying to smoke 'em out. They won't go. You're wasting your time.

A successful camp depends upon each camper doing his full part. If you can cook better than anything else, or chop wood, or browse beds, or make handy contrivances, let that be your special fun—but help with your full load of the *routine*, too.

Be sure your identification card is on your person before you set out for the woods. Write it on a good quality of card, and then dip it in paraffin, or better yet, put it on a bit of fine muslin, wax it, and sew it into your clothes.

Provisions may be left to the last, but all other purchases should have been completed days before. Allow ample time for every preparation. Do not fly around town the last morning like a decapitated hen. You will find enough to annoy you in camp; and you should start out as calmly and quietly as you go down to your business.

To determine the points of the compass, stand facing the sun in the morning, back to the sun in the afternoon. Raise your arms straight with the shoulder. Your right hand will be south, your left hand, north. If there is no sun, and you are in a pine country, the pine tips will invariably point to the rising sun. If there are no pine trees, study the moss on the trees; the heaviest growth will be on the north side. Check this with at least a dozen trees before coming to a definite conclusion. Generally speaking, the thickest bark will also be to the north.

Take pains to learn carefully what wild plants of your section have food value and are safe to eat. Before eating them in the woods, examine them carefully, and if possible check

them with notes you have previously made in your camp notebook. (See "Poisonous and Edible Plants" in the "Flowers and Trees" volume.)

Learn where to locate emergency bait for your particular section. Grasshoppers and angleworms may be out of the question. Then what about hellgramites, caddis flies, and other water larvæ? Do you know what they look like and where to find them?

Never venture into strange country without a good reliable compass. Remember in this connection that the compass *does not* lie—but that you may be mistaken. Northwest of Hudson Bay there is a point known as the Magnetic Pole. This pole repels the bright end of a compass needle; consequently the blued end *invariably* points north.

You may set your watch, with reasonable accuracy, by the aid of a good compass. Point the hour hand in the direction of the sun, then slowly turn the hand around the dial, keeping it pointed toward the sun, until south (which you have determined with the compass or from your map) comes half-way between the hour hand and twelve. Pay no attention to the minute hand. It is merely the problem of using the watch as a compass, except it is solved for another factor, namely, the time.

Don't forget that the compass will be affected by the close proximity of an ax, cook kit (if it is iron), gun barrel and the like; therefore, to make a correct observation, move several paces from such equipment.

FIGURE 1

Always carry in your knapsack or pocket a bit of tallow candle. It is good for starting a fire on a windy day or when the litter is a bit damp. If you get caught in the dark and have to cook a meal, rig a bit of candle in your mess cup. It will reflect almost as much light as an oil lantern if kept with the bottom of the cup in the wind. Don't trust simply the wax to hold a lighted candle anywhere; stand it in the dirt, slice a potato flat and cut a hole to fit the candle. Many a tent has been set on fire by carelessly knocking over a lighted candle. (See Figure 1.)

A good candlestick for tent use, or for use while cooking, can be made by cutting a green stake the desired length, sharpening the end that is to go in the ground and splitting the head sufficient to slip in a fold of bark, a bit of tin, or even several folds of paper to hold the candle. (See Figure 1 again.)

If you have no candle, but need a light, a fair lamp can be made by rendering any sort of meat fat into a tin and placing in it an improvised wick of cloth. Let the wick hang well over the edge of the tin and light it.

A few matches can be kept dry and handy by corking them in a small glass vial that will conveniently fit into a pocket. If you have room, a Colgate's shaving can with screw top also makes an excellent safety match-box. Put the heads of the matches to the bottom of the can.

To more accurately determine sound, remove your hat and shut your eyes.

If you have no can-opener, use your ax. A swift, well-directed blow, using the lower corner of the cutting edge, will not harm the ax. Cut the can with two slits at right angles to each other and lift the points. Why ruin a good pocket-knife on a 10-cent can of beans?

As an extra kit for note-book, bird glasses, or for gathering small nature specimens while on the hike, cut two slits in an old kodak case and run your belt through them. Adjust the case so as to hang on your left hip. This is a very convenient arrangement, and more satisfactory than pockets or an additional shoulder bag.

Never stop for the night on the near side of a stream or lake if you are counting on crossing it anyway in the morning. There is no time like the present. Disappointments are sometimes aggravating. Look for driftwood, and camp above it, as an invariable rule.

If your watch goes on a strike, rig a sun-dial by sticking a straight stick into the ground as a center and drawing a circle about it. You probably know the time of sunrise or sunset accurately enough to start lettering the dial when the shadow is at one or the other of these points. While it is not absolutely accurate, it does very well for camp.

FIGURE 2

The North Star can be easily located by any one any night that stars are visible. Locate the big dipper, then, with the help of the two guide stars, which are the two farthest from the handle in the dipper, the North Star will easily be located. When you stand exactly facing the North Star, you are facing north. (See Figure 2.)

Remember these reliable weather signs:
East wind brings rain.
West wind brings clear, bright, cool weather.
North wind brings cold.
South wind brings heat.
Birds fly high when the barometer is high, and low when the barometer is low.

A bale of cheap hay or straw purchased at the nearest town, or from a neighboring farmer or rancher, will very materially help out your bed, if proper browse is scarce, or lacking altogether. If you decide on a hay or straw bed, take with you a stout tick made of canvas or burlap, with oilcloth bottom to keep out the dampness.

Paper is an excellent non-conductor of heat or cold. A few old papers under you on a canvas cot are equal to a blanket. Old papers on the ground resist dampness for days. Two blankets with paper sewed between them are wind-proof.

To waterproof old canvas, it should first be boiled in strong suds and thoroughly rinsed. When dry, dip into a solution

of 10 gallons of water in which have been dissolved 4 ounces of sulphate of zinc and ½ pound of sal-soda. When these have become perfectly dissolved, add ½ ounce of tartaric acid. Let the canvas soak 24 hours, then hang up to dry. This will add life to your tent. Avoid any compound of linseed oil, unless your tent is already old and you are willing to sacrifice length of life for immediate and temporary protection. If this is the case, wash it as above; when dry, stretch on fence and paint well with the following mixture: To 8 pounds of white lead, add one-quarter the quantity of bulk of spirits of turpentine and 1 ounce of white vitriol. Mix thoroughly; then thin with boiled oil until it is of the consistency of cream.

Another treatment that is recommended, especially for new canvas, is to soak it over night in a solution of 4 pounds of sugar of lead along with 4 pounds of alum dissolved in 3 buckets of rainwater. Dry as above. This is an excellent formula.

Boots and shoes may be satisfactorily waterproofed by taking a 10-cent can of axle-grease, melting it and applying with a sponge or dauber. Beeswax concoctions and many patent water-proofings close the pores of the leather and cause the feet to sweat. Feet that habitually sweat are very liable to grow tender and raw, especially between the toes.

A lean-to tent or fly shelter may be kept warm and comfortable on cold nights by arranging the night fire so that the canvas catches and deflects the heat rays. Heat rays lose practically none of their heat until they strike some surface that will absorb them. The canvas does not absorb but re-directs the rays to the sleeping figures below. Therefore, whenever possible, drag a small log, say four inches in diameter,

across the entrance to break the draft on the ground and build the fire against a green log of somewhat larger size placed parallel to the first and six feet away. A green log lasts longer, and holds fire. Often camp can be pitched so that a flat rock or old stump will serve the same purpose with considerably less labor.

A wide, single, all-wool blanket is better to roll up into at night than a pair of double bed blankets. A good horse blanket makes a capital camp blanket because of its size and shape.

Observe the type of clothing worn by the "natives" in the section in which you propose to camp. They have discovered what is most comfortable as well as economical for "their parts." You may well take advantage of their experience.

If the tent is a closed tent, a night heater may be easily made by filling a large pail or kettle with red hot embers care-

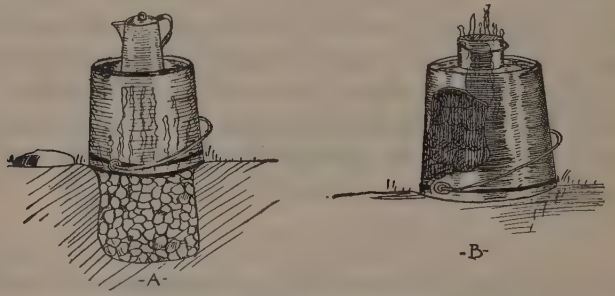


FIGURE 3

fully selected. Place over them a pan or lid that will fit tight and weight it down with a large rock. Such a contrivance will radiate heat for hours. A few red-hot stones in an inverted pail will also give good results with no danger whatever from fire. (See Figure 3.)

Make yourself a pair of moccasins for camp wear by ripping out an old pair for pattern. Form them wet over a last or pair of shoe-trees. Eyelets for them can easily be gotten from any old pair of shoes. Wear a good pair of insoles inside them until your feet become accustomed to that type of footwear.

For nature study, trapping and the like, as well as for canoe wear, the heavy, oil-tanned moccasin or pac is best, but such shoes must be oiled frequently to keep them waterproof and soft.

Don't forget that two good flannel shirts are better than two coats.

To keep flannels from shrinking, wash them in cold water and hang them up dripping wet, allowing them to drip dry. They will be soft and practically without wrinkles.

For go-light trips the weight of every article of equipment should be tested out. "Is this the lightest thing that will serve the purpose?" is a good question to ask over and over. Reducing the weight of one article makes a place for some other desirable thing. This is one of the marked advantages of the aluminum ware. It is light and durable.

To get the maximum good from your blanket, wrap yourself in it as follows: First lie down and spread the blanket across you, then raise both legs with the knees stiff. With your hands, tuck each side of the blanket under you, one on top of the other. Relax the legs and raise yourself on your heels

and shoulders and tuck the blanket well under your hips; now, no matter what way you happen to roll, you will always have a covering of blanket.

Keep all leather parts of your outfit—knapsack and pack-sack straps, camera case, belt, ax-guard and the like—in soft, pliable shape by rubbing them once a year with neat's-foot oil. If this is unavailable, use a good quality home-rendered mutton tallow. Leather goods dry quickly in the weather, unless so treated.

A small tin can with a tight-fitting lid is an excellent container for needles and thread and the like, much better than a

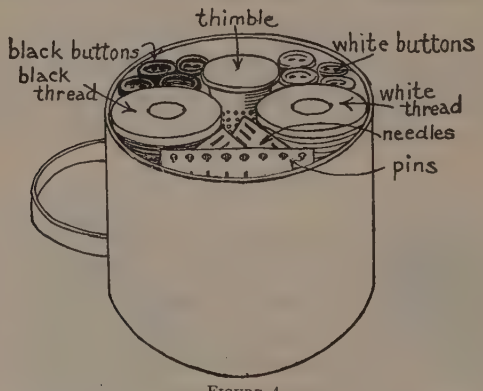


FIGURE 4

cloth bag. The lid may be kept tight by means of a strip of adhesive tape. (See Figure 4.)

To make a very serviceable and practical canteen that will be useful on camping trips, take a flat quart bottle and sew over it a close-fitting cover of flannel. Then make a canvas

bag to fit closely over the lower two-thirds of it, and attach to the top edge of this a strap to go over the shoulder. By wetting the flannel cover occasionally, you can keep the contents cool in the hottest weather.

Carry a small bit of fat pine in your knapsack to aid in starting a fire on damp days or in a storm. Incidentally, such a bit of pitch may come in very handy as an emergency torch. Dry birchbark will accomplish the same ends, is easy to carry, and has practically no weight.

Stewart Edward White suggests an excellent little stunt to aid in getting a quick fire on damp days or in deep woods. Rig a bit of brass tube three or four inches long into a two-foot piece of small rubber tubing. Flatten the brass tube into a thin fan. By placing the brass in the fire and blowing in the end of the hose, combustion may be materially increased.

A fire may be kindled by focusing the sun's rays through the crystal of your watch (or even your eye glasses) onto a pile of fine lint, scrapings from a cotton garment, or fine bits of inner bark. If a live coal is secured, wrap the feeble spark in a bit of lint and fine litter placed in your handkerchief and gently blow until it breaks into flame. Be certain to have a kindling ready to utilize your tiny flame.

Never, under any circumstances, throw down a burning match. Put it out first. Fools and burning matches are the unfailing recipe for forest fires and consequent loss.

Dry wood may most always, even in excessively wet weather, be found on the inside of sound stumps or at the heart of half rotten down-logs; especially true of pine.

Generally speaking, axes as they come from the factories have a decided bevel near the cutting edge. This should be ground away on a good grindstone. The proper way to grind an ax is to start well back on the blade and grind it out to the edge until all of the bevel has been ground away. The thickest part of the blade should not be in the center as commonly supposed, but somewhat to the corner farthest away from the ax-man. An ax so ground will spring the chips nicely and will rarely, if ever, bind in even dry wood.

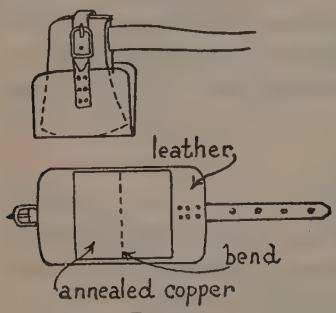


FIGURE 5

Carry a sharp, flat file about eight inches long with which to grind out bad nicks in your ax. Smooth it into final shape with a handy-sized carborundum stone. A convenient way to safely carry a sharp ax will be seen in Figure 5.

Warm a cold ax before cutting heavy timbers with it. Don't use the handle of your ax for prying open obstinate splits; use a wooden wedge or plug. It takes time, but not so much time as the proper fitting of a new handle into the ax, if indeed you are fortunate enough to have one.

Carelessly used axes are more dangerous than guns. Aim carefully. See that there are no overhanging limbs or branches

that might obstruct the blow when splitting wood. Watch out for the feet.

The proper way to carry a belt ax is with the edge to the rear, encased in a leather guard and hung on the left hip. If yours is made some other way, it is wrong.

Avoid sitting or being on the bare gound. Use a stone, or your hat, or a bit of bark. The ground may seem dry, but it invariably chills you. A few old burlap sacks about camp come in very convenient for "roosting" about the camp fire.

Air and sun your blankets every day. Your following night's comfort depends upon it. One absolutely dry blanket is worth two damp ones. Use a "tarp," poncho, or oilcloth under you. If there is no sun, build a special fire for the purpose of drying your blankets. It will pay.

Clear your immediate camp site of all tall grass and weeds. They are very bad for hay fever; they breed mosquitoes, and conceal dirt and rubbish of every sort.

For personal use in camp carry a cake of good medicated soap. A good quality of tar soap, Cuticura, arnica, or other healing soap will be a real comfort, and tend to offset chapping, soothe sunburn, and ease insect bites. Dry your hands and face thoroughly. For burns of all kinds, a tiny tube of unguentine will prove a great comfort. It is next thing to impossible to help burning the forehead if much cooking is to be done in the open.

If you get wet from rain or from falling into the water, stop, undress completely, and wring the clothing out. Clothing so treated will soon dry on the body with little or no bad physical effects. If your shoes are wet, do not dry them too fast by the fire. Stiff, hard shoes crack badly. Far better to heat in a fry-pan pebbles or gravel and circulate it inside the boots. If possible, rub the shoes, especially across the instep, with oil. Meat-drippings, if they are not salt, are excellent for this purpose.

When the canteen is dry and the next water-hole is miles away, slip a round, clean pebble under the tongue. A button will do the same thing. If you doubt it, try it!

If you have forgotten your talcum powder, cornstarch will make an excellent substitute. Use it generously wherever clothing or shoes tend to chafe.

Make it a practice to fill your canteen fresh every time you strike water. Experienced campers find good water, then build camp—instead of building camp and then looking for water.

FIGURE 6

A canteen filled with boiling water makes an excellent hot-water bottle in case of sickness or unseasonable weather. It is equal to an extra blanket for warmth.

You can easily make a satisfactory emergency cup by doubling your felt hat so that the end of the brim makes a little hollow. Rinse the dust off well before drinking. (See Figure 6.)

Courtesy of Fred R. Abbott

"BUNKIES" AT CAMP

Photo by Frank O. Koehler

HANDICRAFT IN CAMP

If at all possible, wash soiled clothing before you put it away in your pack, even if such a washing merely means a good rinsing in cold water. Soiled clothing that is left in a duffel bag for days is very unpleasant.

Lemonade is often very much enjoyed in the hot woods when you find yourself "spitting cotton." Before starting on your trip, squeeze the juice of numerous lemons over a thin layer of granulated sugar. When this has thoroughly dried, place it either in large gelatin capsules or in a flat, wide-mouthed bottle. Mix with water as demanded. Druggists supply lemonade tablets that are also very satisfactory. Do not mix or carry lemonade in your canteen.

Do not let blisters go unattended until they become inflamed and raw. Drain them. Sterilize a needle, thread it with sterile cotton string or soft thread, insert the needle at one edge of the blister and draw it through and out of the other edge. Clip off the string, so that the blister may drain for several hours. Powdered boracic acid used generously inside shoes and socks will dry up blisters and toughen the feet, besides keeping them fresh and antiseptic.

Bee-stings and insect bites may be relieved with a soft mud poultice. A poultice of crushed onion is excellent to draw out poison of any kind.

Most campers sometime get a bad poisoning from poison ivy or sumac. There are endless remedies for both. Try these: Rub affected parts well with tincture of grindelia, or with a strong tea made by boiling 10 cents' worth of cardamom

seed in a half pint of water. Either of these is better than sugar of lead.

Real poison ivy always has three leaves in a cluster. The five-leaved ivy is wild Virginia Creeper. The common poison sumac is the small wing-leafed sort. The red sumac, commonly called Staghorn, is harmless. It is the resin of either plant that poisons.

Cache a bit of tin-can cooking equipment and a little grub in your favorite camping region. Why carry such stuff home each time? A can of beans and a bit of bacon, a can of condensed milk and some dry tea, all packed in a press-lid tin, can be hung in a tree, or buried by a rock. At the end of a long tramp they will always be appreciated.

A bottle or little muslin bag of malted milk tablets will make an excellent hot drink at the end of a day's tramp. It is both food and drink, besides being light and concentrated. Build a small fire and heat a cup of water, dissolving the tablets in it. The drink may be further strengthened by adding half a cake of sweet chocolate. For emergency rations or night trips, this is hard to beat.

Don't boil meat or small game too fast. It tends to make it tough and cooks the flavor out. Better simmer it over a slow fire.

A dry onion carried in the knapsack will add flavor to any simple meal, from fried potatoes to canned soup. Try it! To peel onions without making the eyes smart and water, drop them frequently in cold water and work in the open air.

A fry-pan with a folding handle, or equipped with sockets so that a long green stick may be quickly added, is very desirable,

FIGURE 7

especially for hiking trips. Rig one up yourself. (See A, B, and C in Figure 7.)

Beans are a great emergency food because of the concentrated qualities, but it takes so long to cook them well, and canned ones are so heavy, that the tendency is to leave them out. Cook your beans before you start; dry them thoroughly in the oven, crush into small granules, and pack in either moisture-proof press-lid cans or in waterproof bags. As long as moisture can be kept out, they will keep indefinitely. Excellent bean soup may thus be easily and quickly made.

To bake good bread in a frying-pan, take along two tin plates that will just fit into the bottom of your fry-pan. Place the first pan bottom down in the fry-pan, put the dough in this, invert the other pan over the dough and on the rim of the first pan. The rim of the bottom pan should keep it from quite touching the bottom of the fry-pan, thus creating an air space. Cover the top pan with hot coals, and place the whole contrivance in the fire.

FIGURE 8

The hot air space all about the bread will make an excellent oven. (See Figure 8.)

Tabloid tea of excellent quality is now sold by any first-class outfitter. It comes 200 tablets to a bottle. Two tablets make an excellent drink. Especially desirable for hiking trips in autumn and winter. A dry compound may also be had that makes an excellent cocoa by merely adding boiling water. Soxin Tablets are the best substitute for sugar, being 600 times as sweet. One tiny tablet is equal to one cube of sugar.

For hikes from camp, an excellent way to bake a rather large number of potatoes is to take a sheet of No. 9 sheet-iron and fold it double, having driven fifty or sixty eightpenny nails through one-half (the folded over position keeps the nails from

FIGURE 9

dropping out). Place medium-size potatoes on the nails three-quarters of an inch from the iron, block the metal up on four stones, as shown in Figure 9, and build the fire under it. Such an arrangement distributes the heat evenly, and bakes the potatoes as nicely as in an oven.

A very satisfactory oven for bread, biscuit, and even cakes may easily be made, if a heavy tin breadpan or two, equipped with lids, are only included in your outfit.

Dig a hole to correspond in size and shape with your pan, but of course some larger; a bit of a slope is the easiest place. Line the hole carefully with stones the size of your fist. Burn a good fire in it for an hour, then rake out everything except a good layer of ashes. Place your pan in, pack the open space

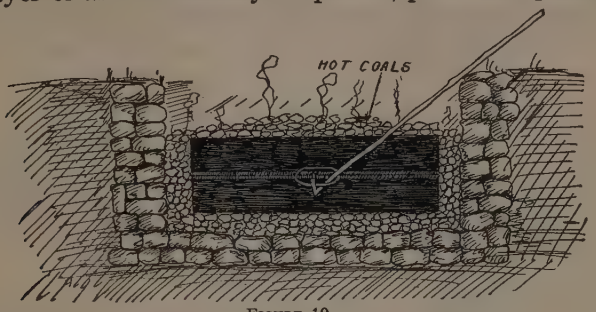


FIGURE 10

between it and the stone wall with ashes and embers, and then if necessary rebuild your fire on top. Such an oven will improve with the using, and will do everything that a Dutch oven will do, without the bother of taking a heavy iron cooker. A little experience will soon give a working schedule of the time required to bake various articles. (See Figure 10.)

A small bottle makes an excellent rolling pin. The lid of a baking powder can makes a handy biscuit cutter, if a hole is punched in the top.

A tin cup and spoon is far better than aluminum for any hot food or drink. Aluminum is a conductor of heat, and in consequence is inclined to burn the mouth.

Ashes from the fire are excellent with which to clean and polish kitchen ware.

A very satisfactory camp canteen can be made by sewing a half dozen thicknesses of burlap or canvas about an ordinary milk can. The burlap must be kept wet, but this may be accomplished simply by having every camper as he drinks pour what is left from his dipper full on the burlap cover. Such a can should be kept in the shade, if possible, but always where a breeze will strike it, as it is the evaporation that cools the water.

A simple double boiler for cooking cereal, rice, custard and the like can easily be made by setting a smaller utensil inside a larger one, and filling the large one to the point of overflow with water.

A convenient pepper and salt container for the knapsack can be made by cutting a joint from the butt of a bamboo

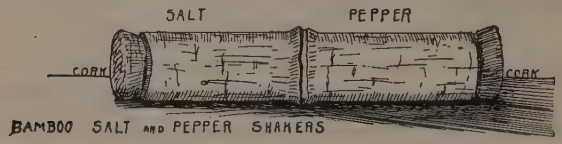


FIGURE 11

fishing-cane. Cut it off so that the joint comes in the middle; fill one end with salt, the other with pepper, and cork each tightly, or mix the pepper and salt for one end, and fill the other with tea or sugar. (See Figure 11.)

Burn all tin cans thoroughly before discarding them. Burned cans soon rust away to nothing and supply no fly food.

In the fishing season never camp without a bit of fishing tackle. (Hooks may be conveniently carried fastened in the

outside band of a felt hat.) Carry the line in the pocket. If you can't find a grasshopper or grub (look in old, rotting wood), or a hellgramite, a scrap of fat bacon, bit of frog, or in fact any sort of meat, will often make a catch possible. A few nice fish invariably help the menu.

In the lake and river country, bullfrogs are plentiful, and their legs, fried in bacon grease, are a real treat. Catch them with a snatch hook, a spear, or with the hands, if you have some sort of a camp lantern. Locate the sound, work in quietly until the frog is discovered. Keep the light steadily upon him until you are close enough to make a quick grab. Place the frog in a bag with a shirr-string about it for safety's sake; dress at once, and soak the legs in salt water before frying.

A very effective fish bait is made by inclosing a live minnow in a short section of glass tube, which is filled with water and both ends closed with corks. This is used in place of the spoon.

To effectively clean a greasy frying-pan before placing it in your pack, heat it to a good heat, then plunge into cold water. Finish the job by wiping it out with grass, leaves or the like.

A convenient bit of equipment to carry is a tin or aluminum baker. These fold flat, weigh little, and make possible a great variety of food that it is a nuisance to cook on the open fire. For bread, biscuits, baked fish, and small game it is unsurpassed. The cooking may be done by the evening camp fire, and at a comfortable distance. The reflected heat rays are

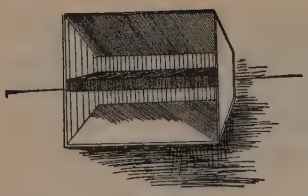


FIGURE 12

focused on the pan, both top and bottom, and are equally distributed. For a good meat-pie, a baker cannot be beaten; and any boy can easily make one. (See Figure 12.) A new bright bucket will do very well for this purpose. (See Figure 13 for suggestion, which is used here by courtesy of *Forest and Stream*.)

To keep from splitting crotched poles, select stakes with stout side branches instead of exact crotches, round the tops

Front View — Side View — Back View

FIGURE 13

of the stakes slightly and drive only on the main stake. (See Figure 14.)

Dig the fire trench in line with the direction of the prevailing winds. Line it with small stones, if possible, as these materially help to hold the heat.

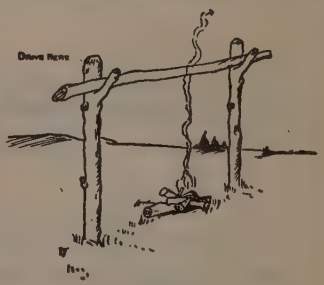


FIGURE 14

A bit of good rope is very often a blessing. Small sash-cord is best. Tape the ends, coil and hang to the belt, as shown in Figure 15.

If you wish to discover the direction of the wind, especially

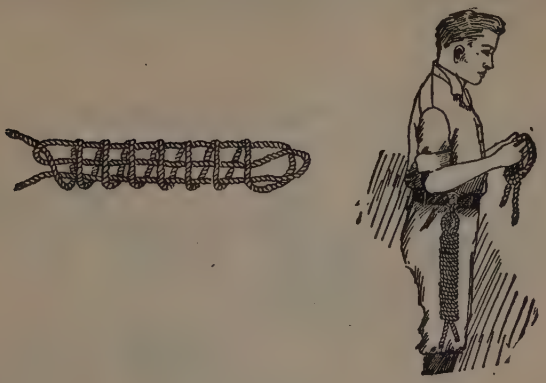


FIGURE 15

if it is light, moisten your finger and hold it in the air. The cool side of the finger indicates the direction of the wind.

Be kind to the wood-folks around your camp—the birds and the mammals, both. Remember that the forest was made especially for them, and that therefore they are your

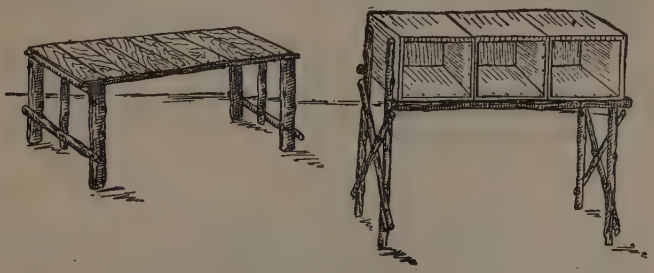


FIGURE 16

natural hosts. So be their guest in all that the term implies; don't be an unwelcome and ill-bred intruder. You will find that virtually all of them are quite willing to be friendly, once

that they see you are of that mind; and this they will be very quick to detect.

A little ingenuity will supply an assortment of tables and cupboards for almost any camp. Use the material close at

FIGURE 17

hand, along with such packing cases and boxes as fall to your lot. Figure 16 is suggestive.

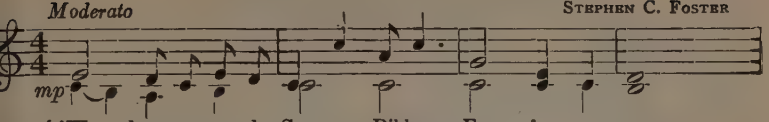
Figure 17 will suggest a very convenient way for two boys to transport a considerable load of equipment or food some distance into the woods without carrying it. This is an adoption of the Indian method of moving, and not only practical, but a very great labor-saver. Any handy camper can easily rig such a drag with a sharp ax and bits of wire or rope.

SONGS FOR THE CAMP

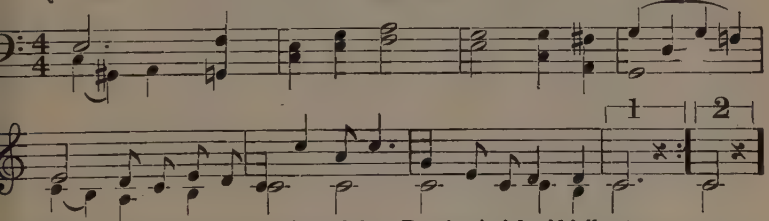
OLD FOLKS AT HOME

Moderato

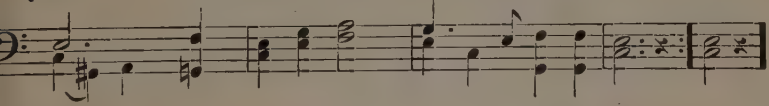
STEPHEN C. FOSTER



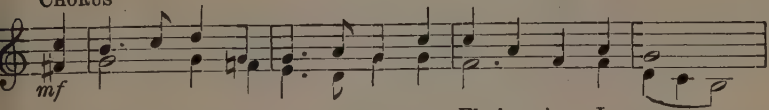
1. 'Way down up-on de Swa-nee Ribber, Far, far a - way,
   All up an' down de whole cre - a-tion Sad - ly I roam,
2. All roun' de lit - tle farm I wander'd When I was young,
   When I was play-in' wid my brudder, Hap - py was I;
3. One lit- tle hut a - mong de bush-es, One dat I love,
   When will I see de bees a - hum-min' All roun' de comb?



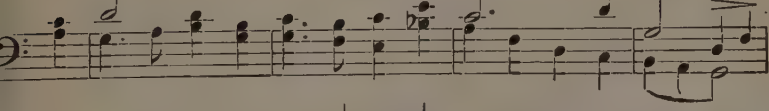
Dere's wha' my heart is turning eb-ber, Dere's wha' de old folks stay.
Still long-in' for de old plan-ta-tion, An' for de old folks at home.
Den man-y hap-py days I squander'd, Man-y de songs I sung.
Oh! take me to my kind old mudder, Dare let me live and die.
Still sad - ly to my mem'ry rushes, No matter where I rove.
When will I hear de ban-jo tummin' Down in my good old home!



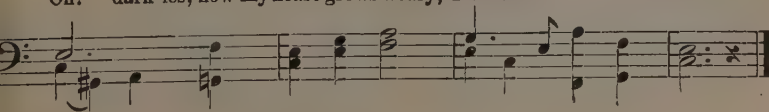
CHORUS



O, all de world am sad and drear-y Eb-'ry-where I roam;



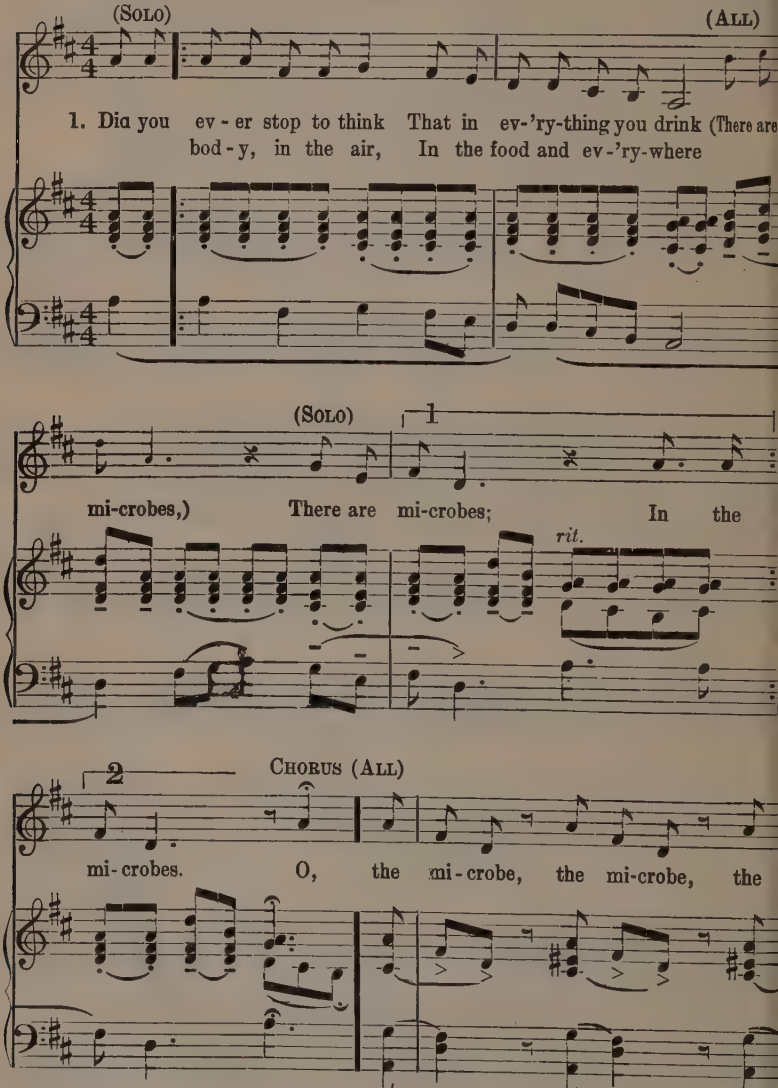
Oh! dark-ies, how my heart grows weary, Far from de old folks at home.



THE MICROBE

RUSSELL A. FIELD — From "Micro-Mania" — WM. H. JOHNS

Allegretto


(SOLO)
(ALL)
1. Did you ev - er stop to think That in ev-'ry-thing you drink (There are
bod - y, in the air, In the food and ev-'ry-where
(SOLO)
1
mi-crobes,) There are mi-crobes; In the
rit.
2
CHORUS (ALL)
mi - crobes. O, the mi - crobe, the mi-crobe, the

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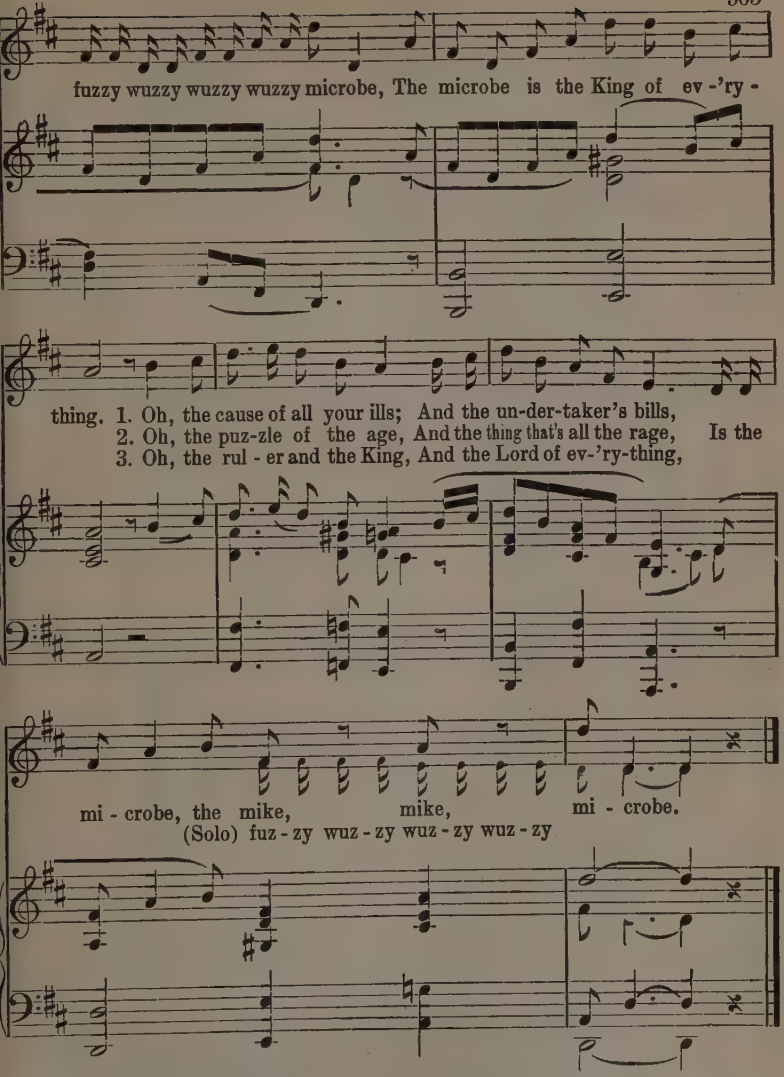
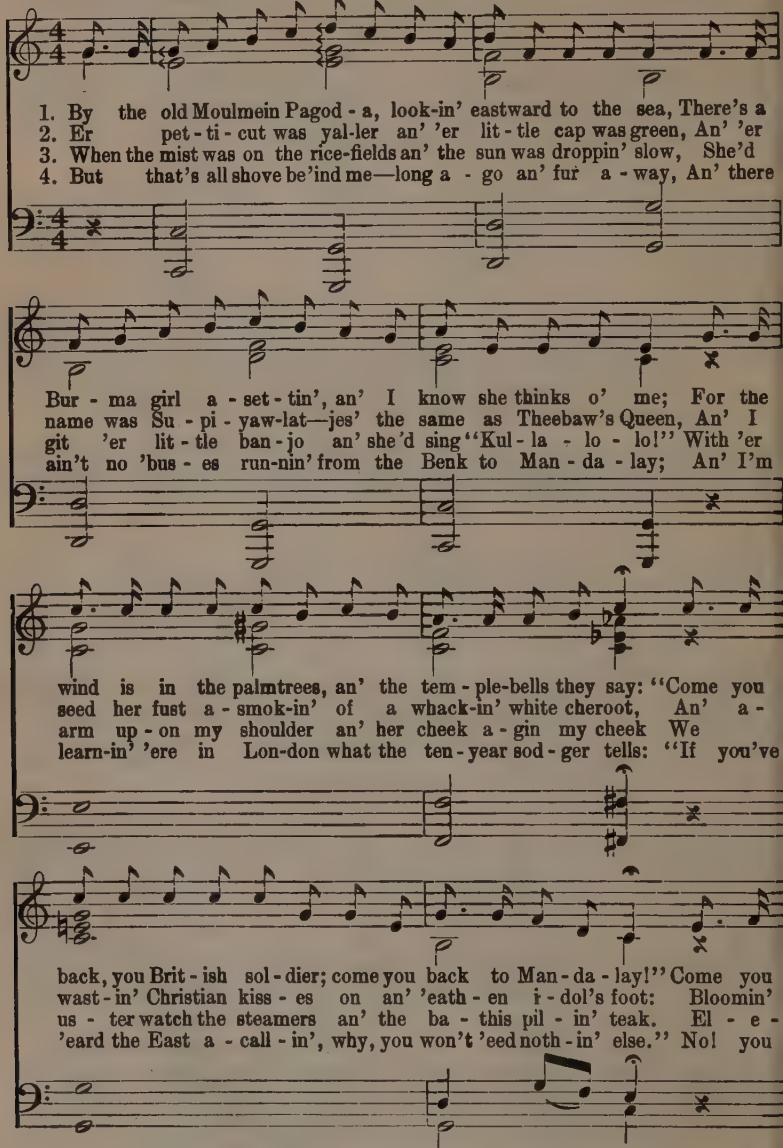

fuzzy wuzzy wuzzy wuzzy microbe, The microbe is the King of ev -'ry -
thing. 1. Oh, the cause of all your ills; And the un-der-taker's bills,
2. Oh, the puz-zle of the age, And the thing that's all the rage, Is the
3. Oh, the rul - er and the King, And the Lord of ev-'ry-thing,
mi - crobe, the mike, mike, mi - crobe.
(Solo) fuz - zy wuz - zy wuz - zy wuz - zy

If you're sick a little bit,
Why of course the cause of it
Is the microbe;
Or if water won't agree
With some people that you see,
It's the microbe.

Now I'm always after germs,
But can never come to terms
With the microbe.
When you think you've got him pat,
Why you don't know where you're at,
With the microbe.

THE ROAD TO MANDALAY

RUDYARD KIPLING — DYNELEY PRINCE


1. By the old Moulmein Pagod - a, look-in' eastward to the sea, There's a
2. Er pet - ti - cut was yal-ler an' 'er lit - tle cap was green, An' 'er
3. When the mist was on the rice-fields an' the sun was droppin' slow, She'd
4. But that's all shove be'ind me—long a - go an' fur a - way, An' there
Bur - ma girl a - set - tin', an' I know she thinks o' me; For the
name was Su - pi - yaw-lat—jes' the same as Theebaw's Queen, An' I
git 'er lit - tle ban - jo an' she'd sing "Kul - la - lo - lo!" With 'er
ain't no 'bus - es run-nin' from the Benk to Man - da - lay; An' I'm
wind is in the palmtrees, an' the tem - ple-bells they say: "Come you
seed her fust a - smok-in' of a whack-in' white cheroot, An' a -
arm up - on my shoulder an' her cheek a - gin my cheek We
learn-in' 'ere in Lon-don what the ten - year sod - ger tells: "If you've
back, you Brit - ish sol - dier; come you back to Man - da - lay!" Come you
wast - in' Christian kiss - es on an' 'eath - en i - dol's foot: Bloomin'
us - ter watch the steamers an' the ba - this pil - in' teak. El - e -
'eard the East a - call - in', why, you won't 'eed noth - in' else." No! you

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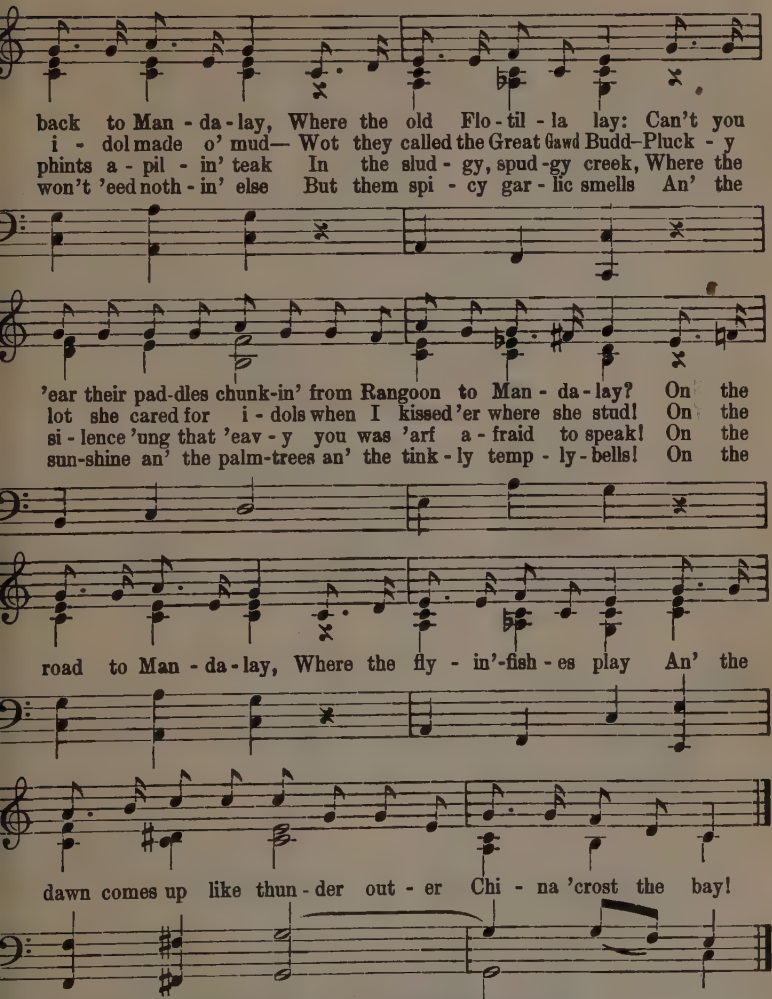

back to Man - da - lay, Where the old Flo - til - la lay: Can't you
i - dol made o' mud— Wot they called the Great Gawd Budd–Pluck - y
phints a - pil - in' teak In the slud - gy, spud - gy creek, Where the
won't 'eed noth - in' else But them spi - cy gar - lic smells An' the
'ear their pad-dles chunk-in' from Rangoon to Man - da - lay? On the
lot she cared for i - dols when I kissed 'er where she stud! On the
si - lence 'ung that 'eav - y you was 'arf a - fraid to speak! On the
sun-shine an' the palm-trees an' the tink - ly temp - ly - bells! On the
road to Man - da - lay, Where the fly - in'-fish - es play An' the
dawn comes up like thun - der out - er Chi - na 'crost the bay!

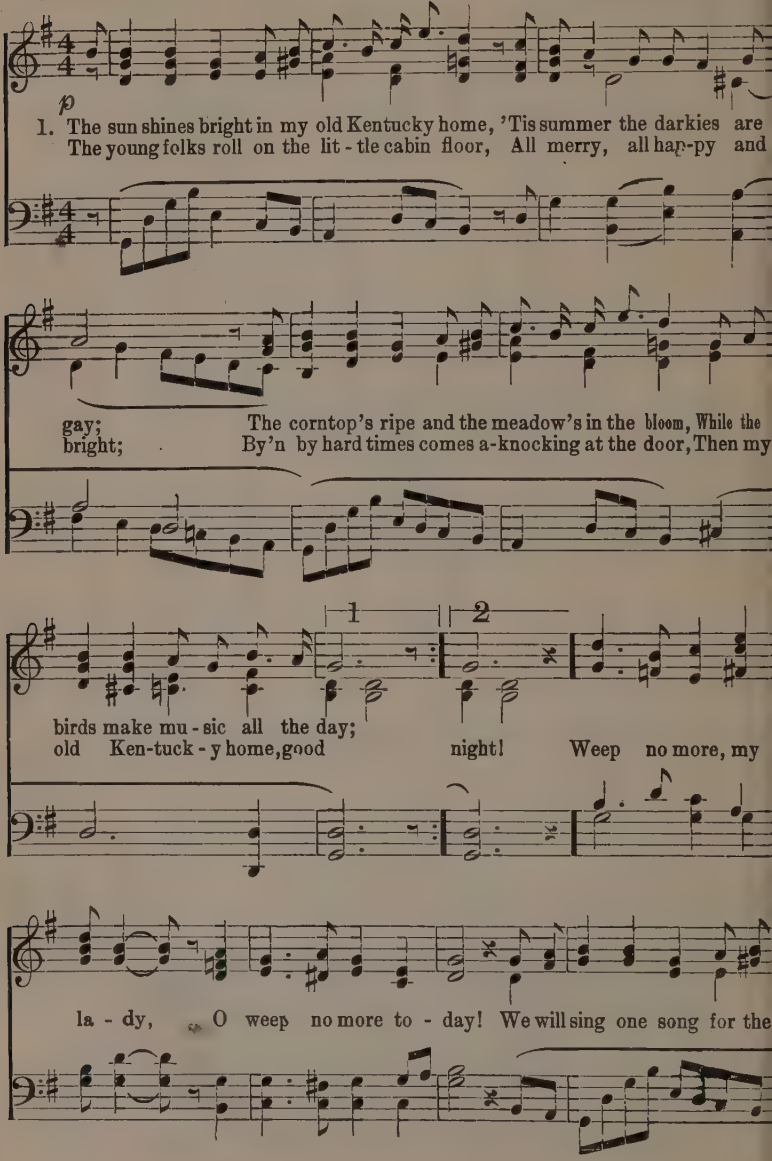
5 I am sick o' wastin' leather on these gutty pavin'-stones,
An' the blasted Henglish drizzle wakes the fever in my bones;
Tho' I walks with fifty 'ousemaids outer Chelsea to the Strand,
An' they talks a lot o' lovin', but wot do they understand?
Beefy face an' grubby 'and—Law', wot do they understand?
I've a neater, sweeter maiden in a cleaner, greener land! On the, etc.

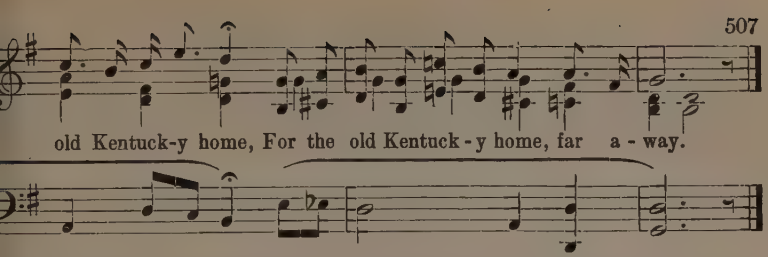
6 Ship me somewheres east of Suez where the best is like the worst,
Where there aren't no Ten Commandments, an' a man can raise a thirst;
For the temple-bells are callin', an' it's there that I would be—
By the old Moulmein Pagoda, lookin' lazy at the sea—
On the road to Mandalay, Where the old Flotilla lay,
With our sick beneath the awnings when we went to Mandalay! On the, etc.

MY OLD KENTUCKY HOME

Andante con tenuto

STEPHEN C. FOSTER


p
1. The sun shines bright in my old Kentucky home, 'Tis summer the darkies are gay;
The young folks roll on the lit - tle cabin floor, All merry, all hap-py and bright;
The corntop's ripe and the meadow's in the bloom, While the birds make mu - sic all the day;
By'n by hard times comes a-knocking at the door, Then my old Ken-tuck - y home, good night!
1
2
Weep no more, my la - dy, O weep no more to - day! We will sing one song for the

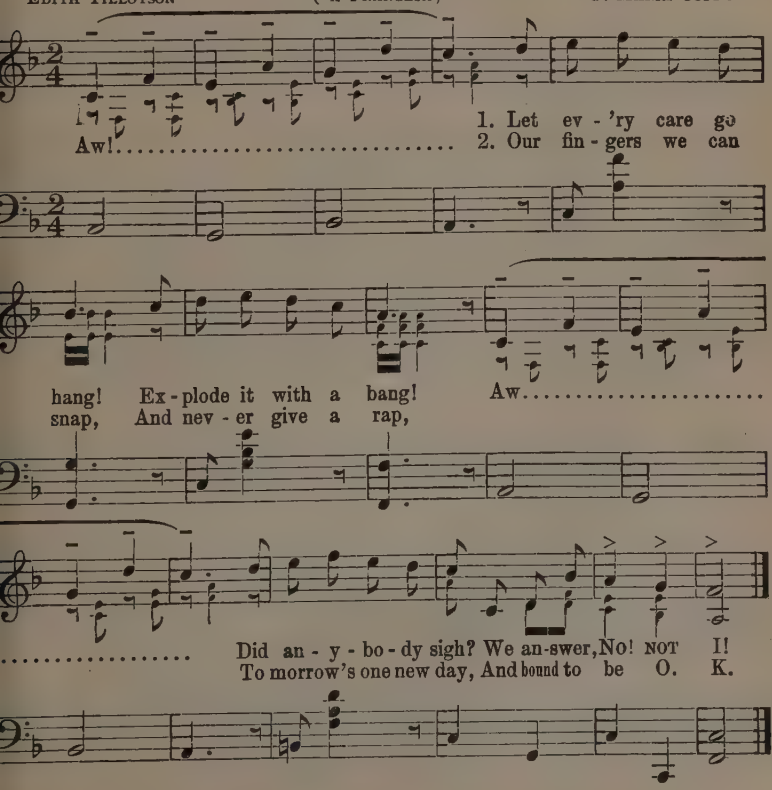


They hunt no more for the possum and the coon,
On the meadow, the hill and the shore;
They sing no more by the glimmer of the moon,
On the bench by the old cabin door;
The days go by like a shadow o'er the heart,
With sorrow where all was delight;
The time has come when the darkies have to part,
Then my old Kentucky home, good night!

3 The head must bow and the backwill have to bend,
Wherever the darky may go;
A few more days, and the trouble all will end,
In the field where the sugar-canes grow;
A few more days for to tote the weary load,
No matter, 'twill never be light;
A few more days till we totter on the road,
Then my old Kentucky home, good night!

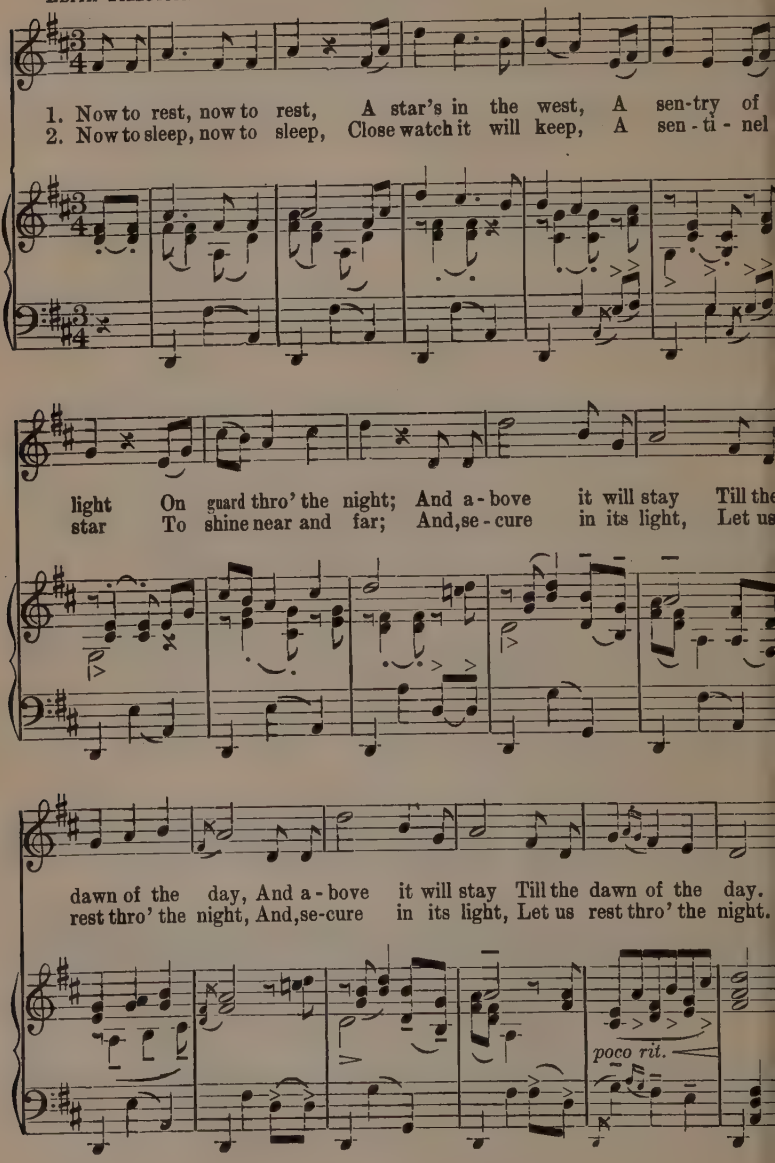
CHEER UP

EDITH TILLOTSON ('A FRANGESA) P. MARIA COSTA


Aw!
1. Let ev-'ry care go
2. Our fin-gers we can
hang! Ex-plode it with a bang!
snap, And nev-er give a rap,
Aw.....
.....
Did an-y-bo-dy sigh? We an-swer, No! NOT I!
To morrow's one new day, And bound to be O. K.

THE SENTINEL STAR

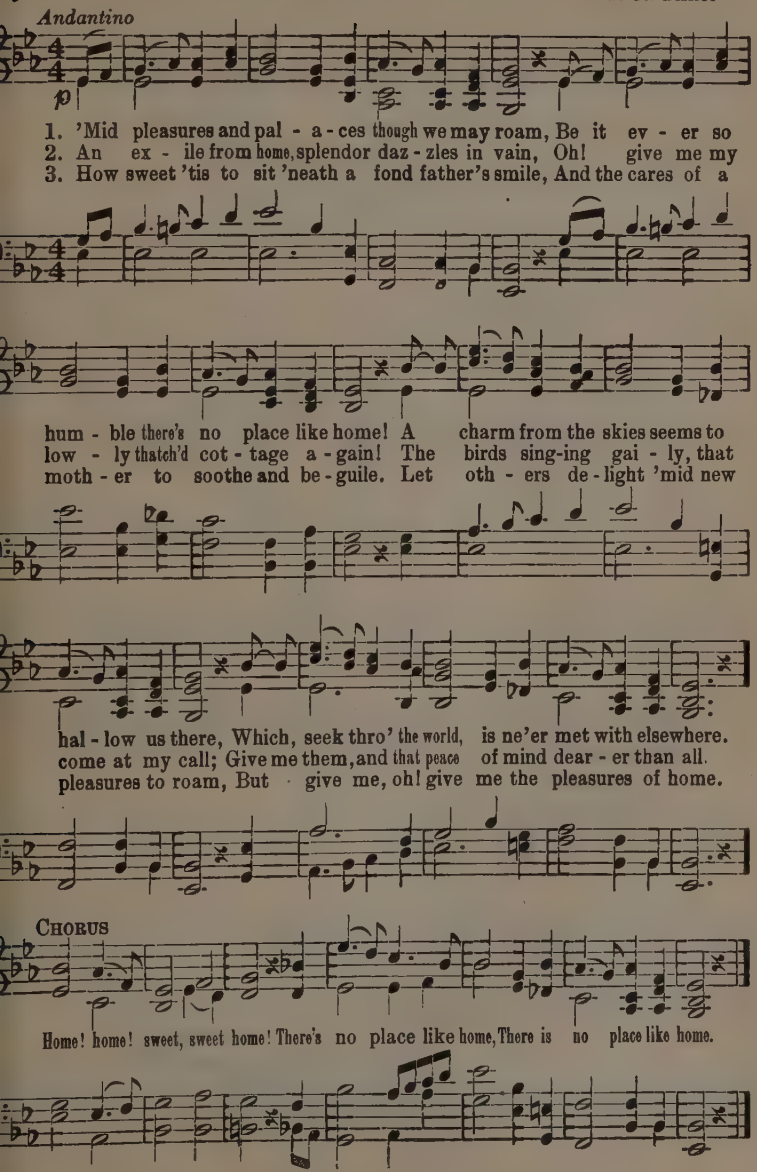
EDITH TILLOTSON (LULLABY) J. BRAHMS


1. Now to rest, now to rest, A star's in the west, A sen-try of
2. Now to sleep, now to sleep, Close watch it will keep, A sen - ti - nel
light On guard thro' the night; And a - bove it will stay Till the
star To shine near and far; And, se - cure in its light, Let us
dawn of the day, And a - bove it will stay Till the dawn of the day.
rest thro' the night, And, se-cure in its light, Let us rest thro' the night.
poco rit.

HOME, SWEET HOME

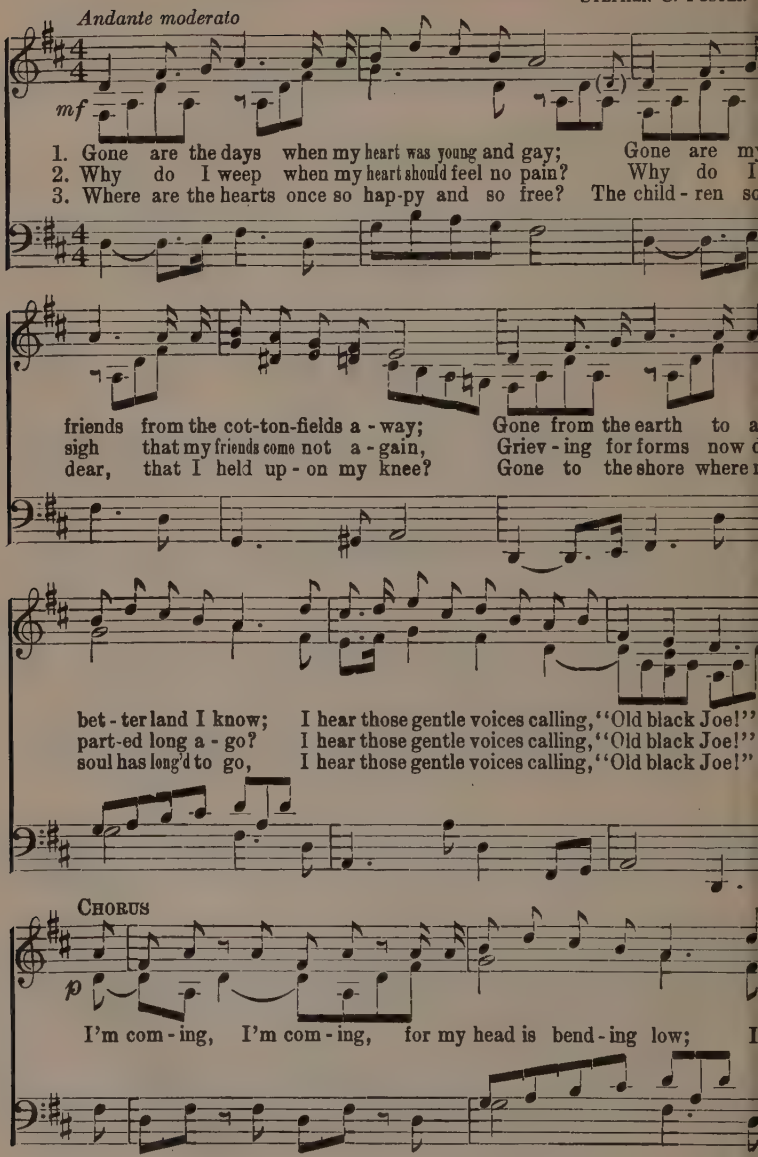
JOHN HOWARD PAYNE — HENRY R. BISHOP

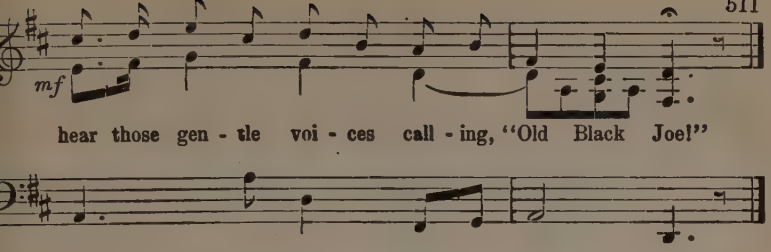
Andantino


p
1. 'Mid pleasures and pal - a - ces though we may roam, Be it ev - er so
2. An ex - ile from home, splendor daz - zles in vain, Oh! give me my
3. How sweet 'tis to sit 'neath a fond father's smile, And the cares of a
hum - ble there's no place like home! A charm from the skies seems to
low - ly thatch'd cot - tage a - gain! The birds sing-ing gai - ly, that
moth - er to soothe and be - guile. Let oth - ers de - light 'mid new
hal - low us there, Which, seek thro' the world, is ne'er met with elsewhere.
come at my call; Give me them, and that peace of mind dear - er than all.
pleasures to roam, But give me, oh! give me the pleasures of home.
CHORUS
Home! home! sweet, sweet home! There's no place like home, There is no place like home.

OLD BLACK JOE

STEPHEN C. FOSTER

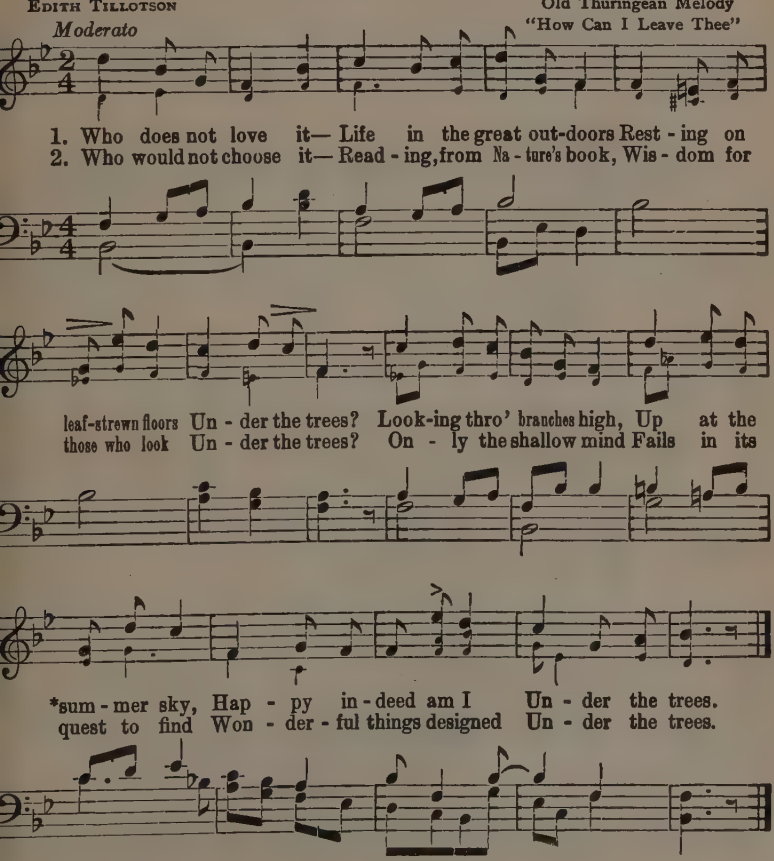

Andante moderato
mf
1. Gone are the days when my heart was young and gay; Gone are my
2. Why do I weep when my heart should feel no pain? Why do I
3. Where are the hearts once so hap-py and so free? The child - ren so
friends from the cot-ton-fields a - way; Gone from the earth to a
sigh that my friends come not a - gain, Griev - ing for forms now
dear, that I held up - on my knee? Gone to the shore where
bet - ter land I know; I hear those gentle voices calling, "Old black Joe!"
part-ed long a - go? I hear those gentle voices calling, "Old black Joe!"
soul has long'd to go, I hear those gentle voices calling, "Old black Joe!"
CHORUS
p
I'm com - ing, I'm com - ing, for my head is bend - ing low;



UNDER THE TREES

EDITH TILLOTSON

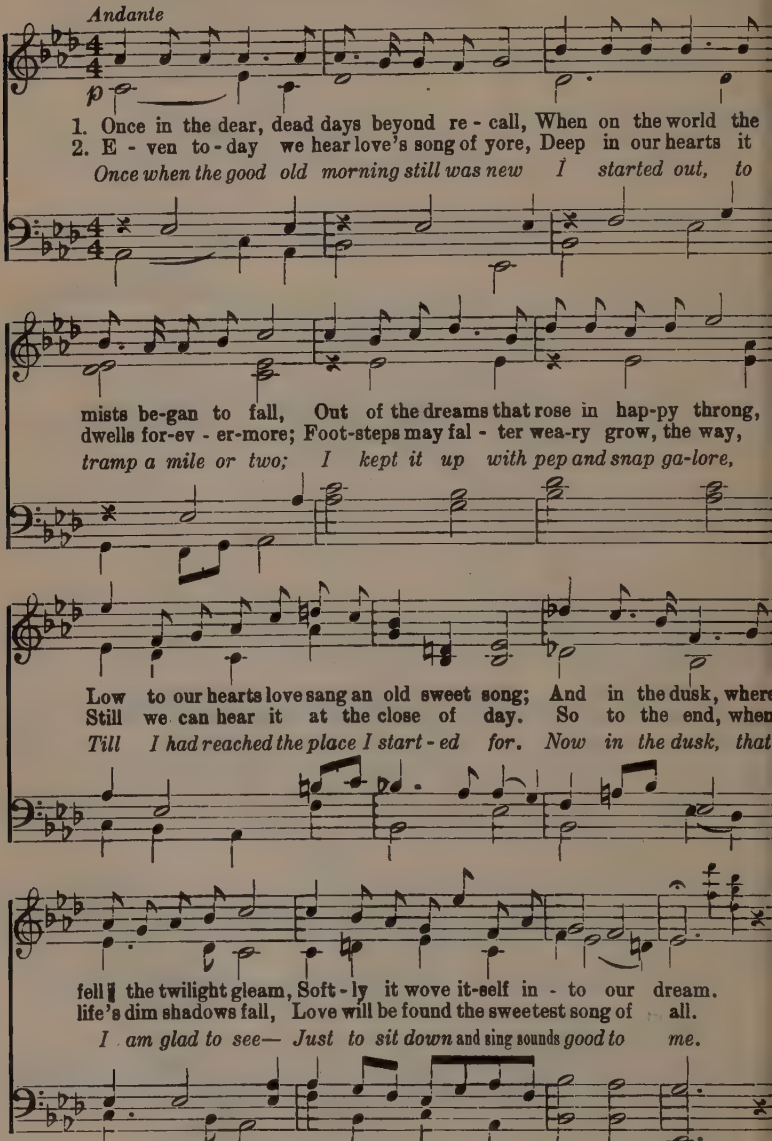
Old Thuringean Melody
"How Can I Leave Thee"

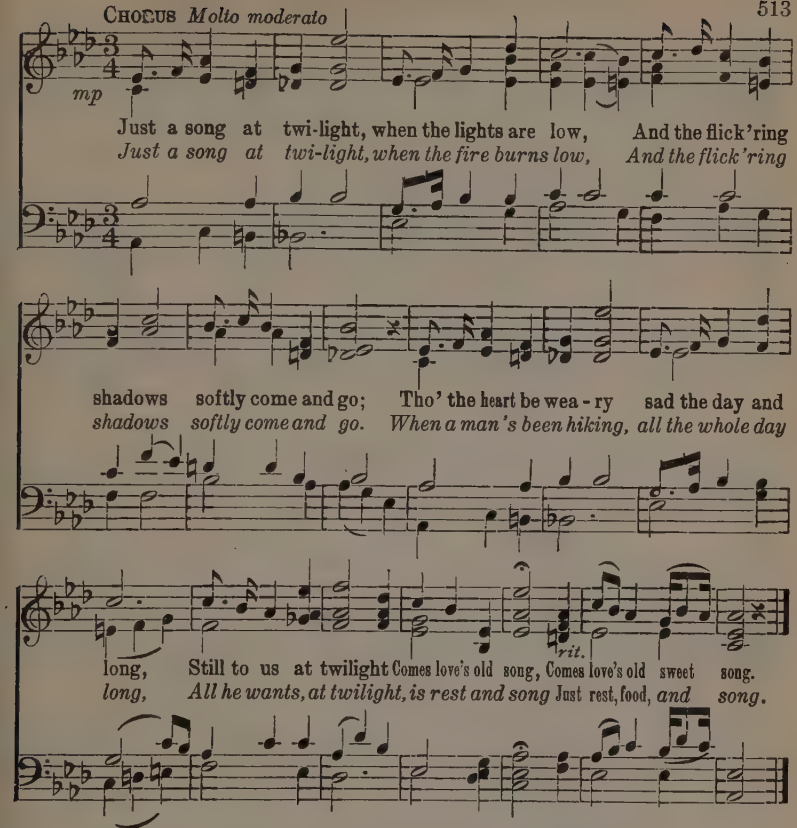

Moderato
1. Who does not love it— Life in the great out-doors Rest - ing on
2. Who would not choose it— Read - ing, from Na - ture's book, Wis - dom for
leaf-strewn floors Un - der the trees? Look-ing thro' branches high, Up at the
those who look Un - der the trees? On - ly the shallow mind Fails in its
*sum - mer sky, Hap - py in - deed am I Un - der the trees.
quest to find Won - der - ful things designed Un - der the trees.

*or, autumn; etc.

LOVE'S OLD SWEET SONG

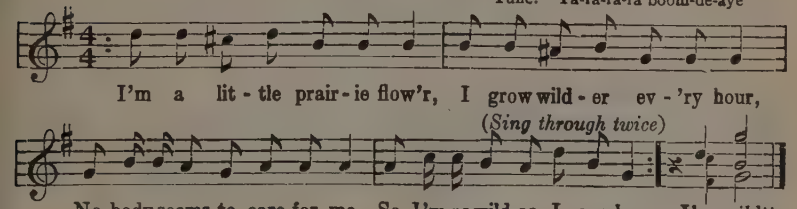
G. Clifton Bingham — **NOW IN THE DUSK** — J. L. Molloy


Andante
p
1. Once in the dear, dead days beyond re - call, When on the world the
2. E - ven to - day we hear love's song of yore, Deep in our hearts it
Once when the good old morning still was new I started out, to
mists be-gan to fall, Out of the dreams that rose in hap-py throng,
dwells for-ev - er-more; Foot-steps may fal - ter wea-ry grow, the way,
tramp a mile or two; I kept it up with pep and snap ga-lore,
Low to our hearts love sang an old sweet song; And in the dusk, where
Still we can hear it at the close of day. So to the end, when
Till I had reached the place I start - ed for. Now in the dusk, that
fell the twilight gleam, Soft - ly it wove it-self in - to our dream.
life's dim shadows fall, Love will be found the sweetest song of all.
I am glad to see— Just to sit down and sing sounds good to me.


CHORUS Molto moderato
mp
Just a song at twi-light, when the lights are low, And the flick'ring
Just a song at twi-light, when the fire burns low, And the flick'ring
shadows softly come and go; Tho' the heart be wea - ry sad the day and
shadows softly come and go. When a man's been hiking, all the whole day
long, Still to us at twilight Comes love's old song, Comes love's old sweet song.
long, All he wants, at twilight, is rest and song Just rest, food, and song.
rit.

LITTLE PRAIRIE FLOWER

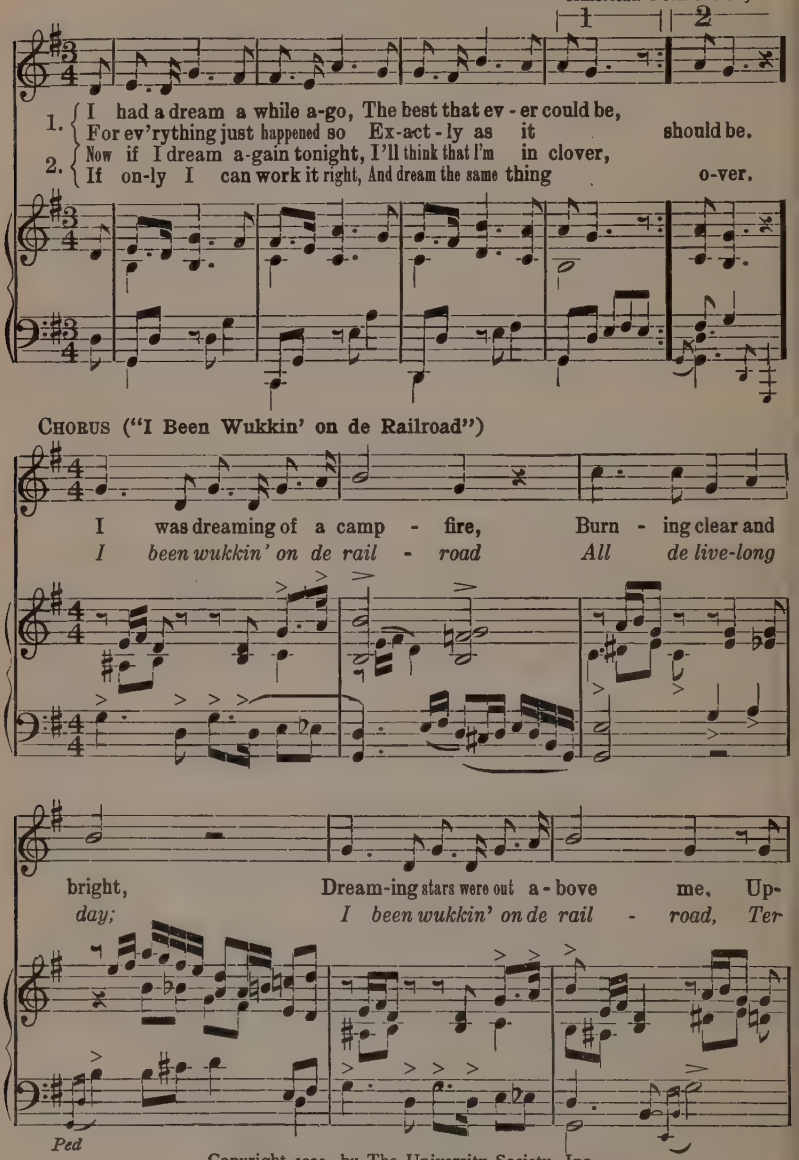
Tune: "Ta-ra-ra-ra boom-de-aye"


I'm a lit - tle prair - ie flow'r, I grow wild - er ev - 'ry hour,
(Sing through twice)
No-body seems to care for me, So I'm as wild as I can be. I'm wild!!

Spoken: (1) Wild as a wild flow'r. (2) Hoo - ray!

1. Stand up; plant finger in center of scalp, pivot once around. 2. Sit down.

THAT DREAM CAME TRUE

American Folk Melody

1
2
1. I had a dream a while a-go, The best that ev - er could be,
For ev'rything just happened so Ex-act - ly as it should be.
2. Now if I dream a-gain tonight, I'll think that I'm in clover,
If on-ly I can work it right, And dream the same thing o-ver.
CHORUS ("I Been Wukkin' on de Railroad")
I was dreaming of a camp - fire, Burn - ing clear and
I been wukkin' on de rail - road All de live-long
bright, Dream-ing stars were out a - bove me, Up-
day; I been wukkin' on de rail - road, Ter
Ped

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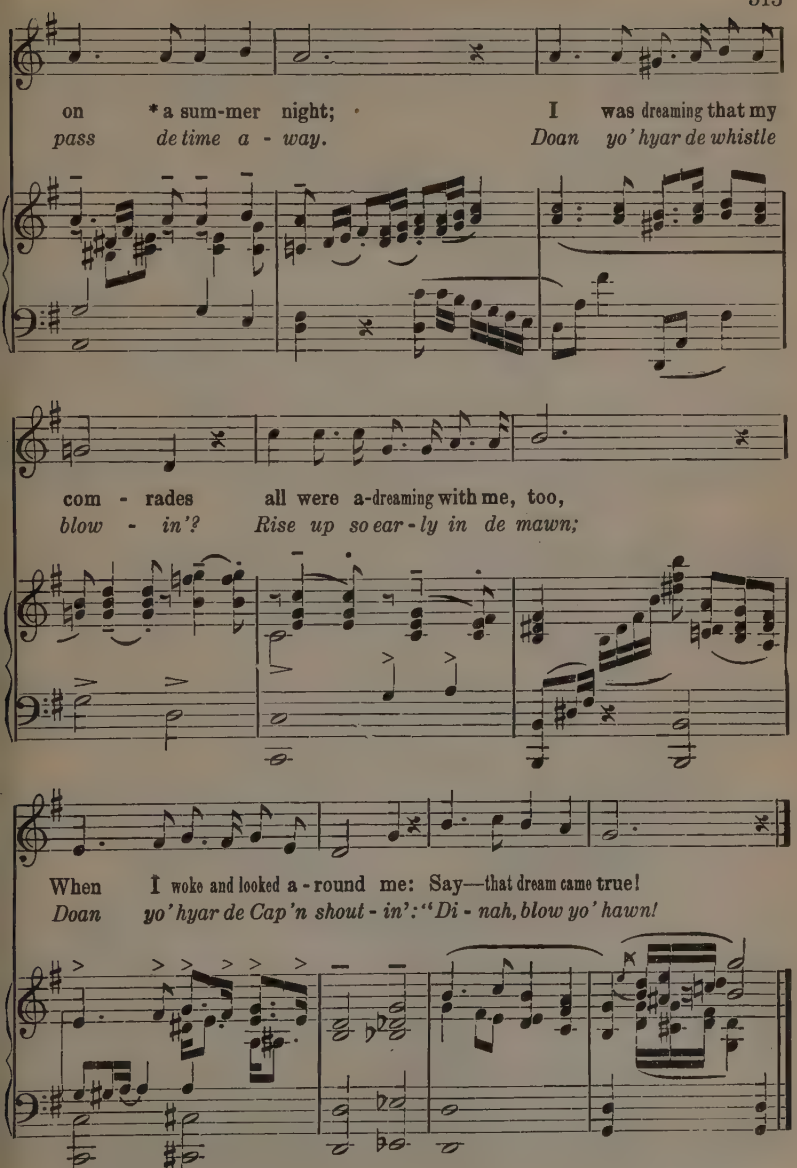
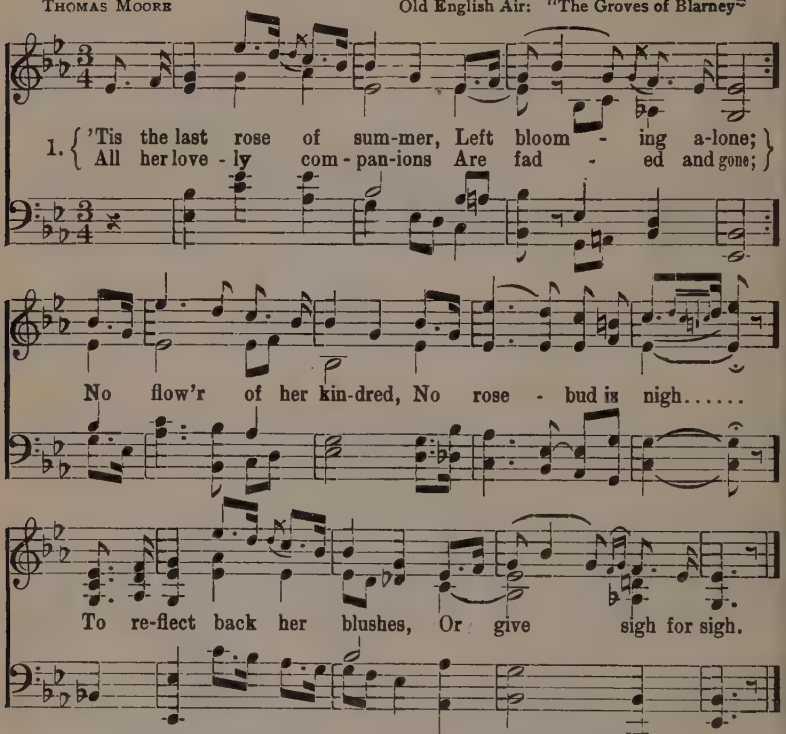

on *a sum-mer night; I was dreaming that my
pass de time a - way. Doan yo' hyar de whistle
com - rades all were a-dreaming with me, too,
blow - in'? Rise up so ear - ly in de mawn;
When I woke and looked a - round me: Say—that dream came true!
Doan yo' hyar de Cap'n shout - in': "Di - nah, blow yo' hawn!

* "an Autumn", *or*, "a fair Spring" night, as occasion demands.

LAST ROSE OF SUMMER

THOMAS MOORE — Old English Air: "The Groves of Blarney"

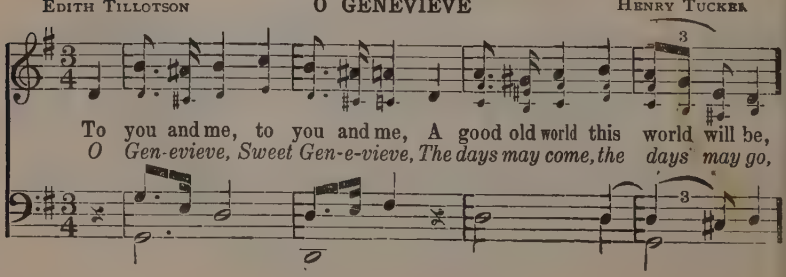

1. 'Tis the last rose of sum-mer, Left bloom - ing a-lone;
All her love - ly com - pan-ions Are fad - ed and gone;
No flow'r of her kin-dred, No rose - bud is nigh.....
To re-flect back her blushes, Or give sigh for sigh.

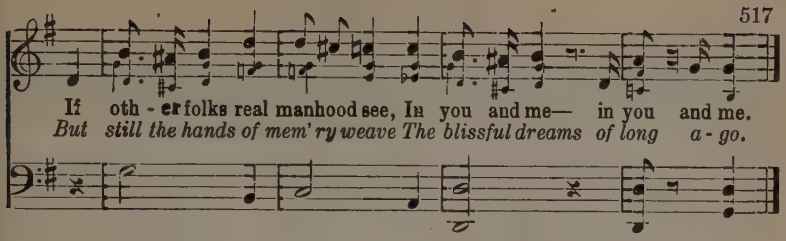
2 I'll not leave thee, thou lone one!
To pine on the stem,
Since the lovely are sleeping,
Go, sleep thou with them;
Thus kindly I scatter
Thy leaves o'er the bed,
Where thy mates of the garden
Lie scentless and dead.

3 So soon may I follow,
When friendships decay,
And from love's shining circle
The gems drop away!
When true hearts lie withered,
And fond ones are flown,
Oh, who would inhabit
This bleak world alone?

YOU AND ME

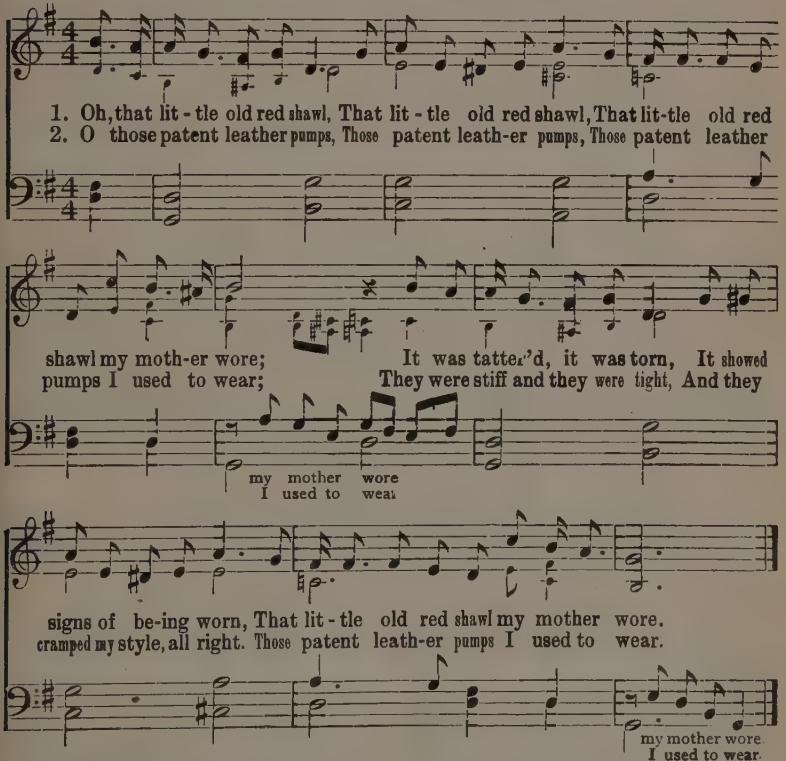
EDITH TILLOTSON — O GENEVIEVE — HENRY TUCKER




If oth - er folks real manhood see, In you and me— in you and me.
But still the hands of mem' ry weave The blissful dreams of long a - go.

THE LITTLE OLD RED SHAWL

EDITH TILLOTSON


1. Oh, that lit - tle old red shawl, That lit - tle old red shawl, That lit-tle old red
2. O those patent leather pumps, Those patent leath-er pumps, Those patent leather
shawl my moth-er wore; It was tatter'd, it was torn, It showed
pumps I used to wear; They were stiff and they were tight, And they
my mother wore
I used to wear
signs of be-ing worn, That lit - tle old red shawl my mother wore.
cramped my style, all right. Those patent leath-er pumps I used to wear.
my mother wore
I used to wear.

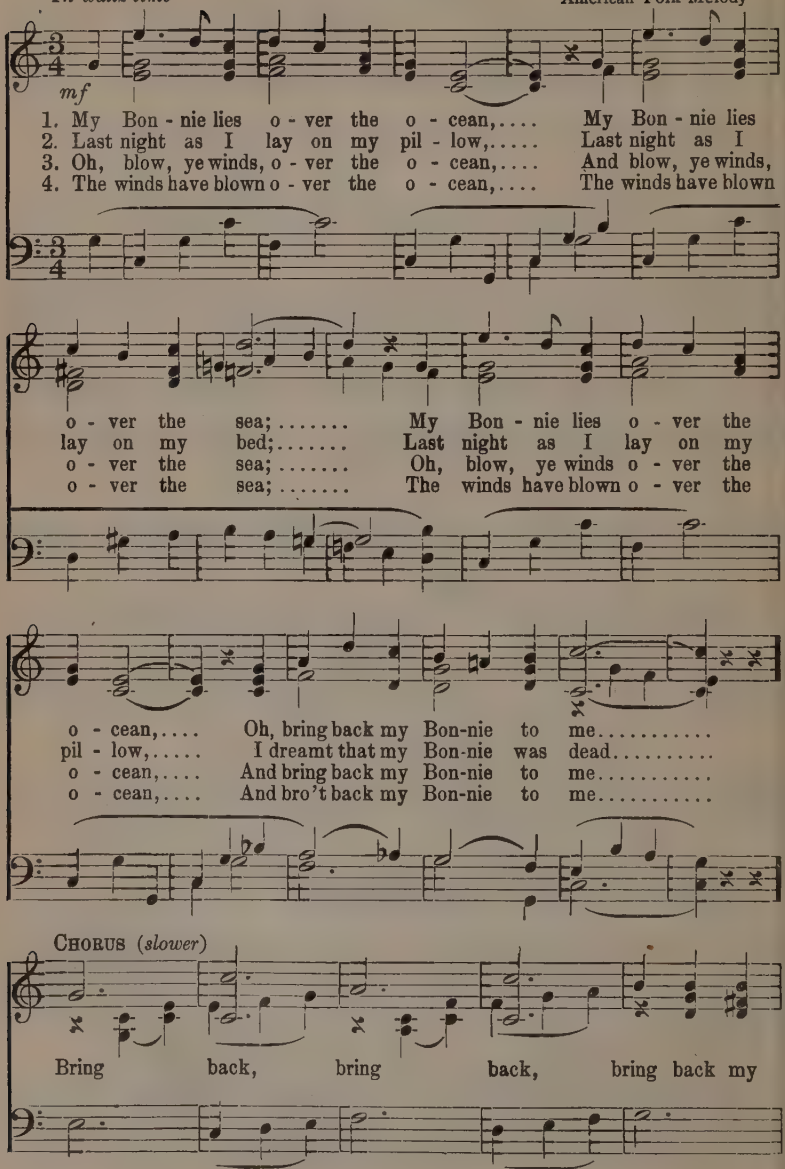
3 O that little busy bee,
That little busy bee,
That busy bee that buzzed about the barn;
'Twas a pretty little thing,
But it sure knew how to sting—
That busy bee that buzzed about the barn;

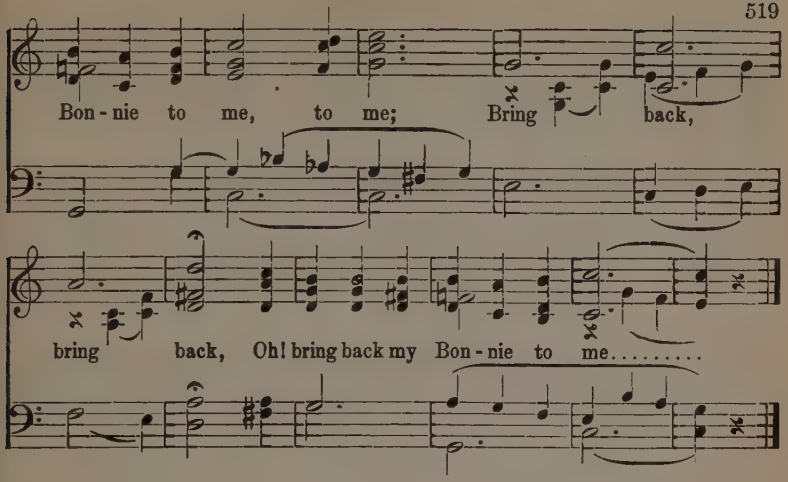
4 O the days of long ago,
The days of long a-go
The happy, happy days when I was young,
*In the good old fashioned time,
*When a soda cost a dime,
The happy, happy days when I was young.

* By changing this couplet to suit any local joke, this verse may be prolonged indefinitely.

MY BONNIE

In waltz time

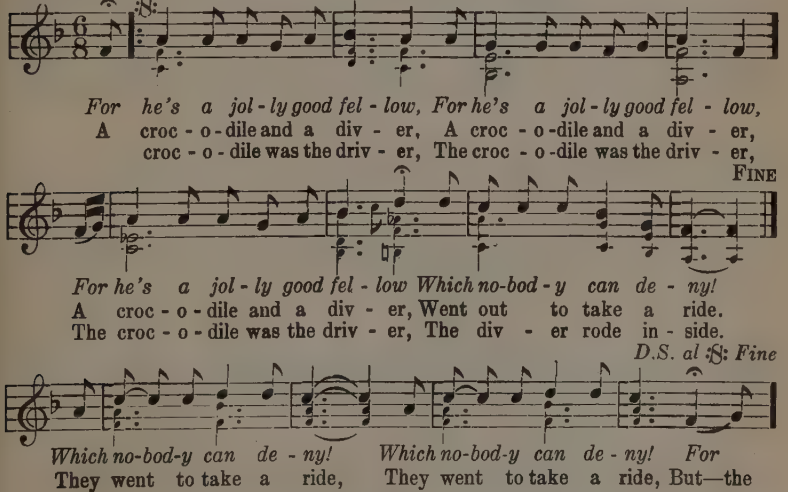
American Folk Melody

mf
1. My Bon - nie lies o - ver the o - cean,.... My Bon - nie lies
2. Last night as I lay on my pil - low,..... Last night as I
3. Oh, blow, ye winds, o - ver the o - cean,.... And blow, ye winds,
4. The winds have blown o - ver the o - cean,.... The winds have blown
o - ver the sea;..... My Bon - nie lies o - ver the
lay on my bed;..... Last night as I lay on my
o - ver the sea;..... Oh, blow, ye winds o - ver the
o - ver the sea;..... The winds have blown o - ver the
o - cean,.... Oh, bring back my Bon-nie to me.....
pil - low,..... I dreamt that my Bon-nie was dead.....
o - cean,.... And bring back my Bon-nie to me.....
o - cean,.... And bro't back my Bon-nie to me.....
CHORUS (*slower*)
Bring back, bring back, bring back my



FOR HE'S A JOLLY GOOD FELLOW!

A CROCODILE AND A DIVER

GREETING.— LEADER: Whazzamatter with — — —? CROWD: He's all right! LEADER: Who's all right? CROWD: — — —! ALL: (Sing) For he's a jolly, etc.


For he's a jol - ly good fel - low, For he's a jol - ly good fel - low,
A croc - o - dile and a div - er, A croc - o - dile and a div - er,
croc - o - dile was the driv - er, The croc - o - dile was the driv - er,
FINE
For he's a jol - ly good fel - low Which no-bod - y can de - ny!
A croc - o - dile and a div - er, Went out to take a ride.
The croc - o - dile was the driv - er, The div - er rode in - side.
D.S. al 𝄋: Fine
Which no-bod-y can de - ny! Which no-bod-y can de - ny! For
They went to take a ride, They went to take a ride, But—the

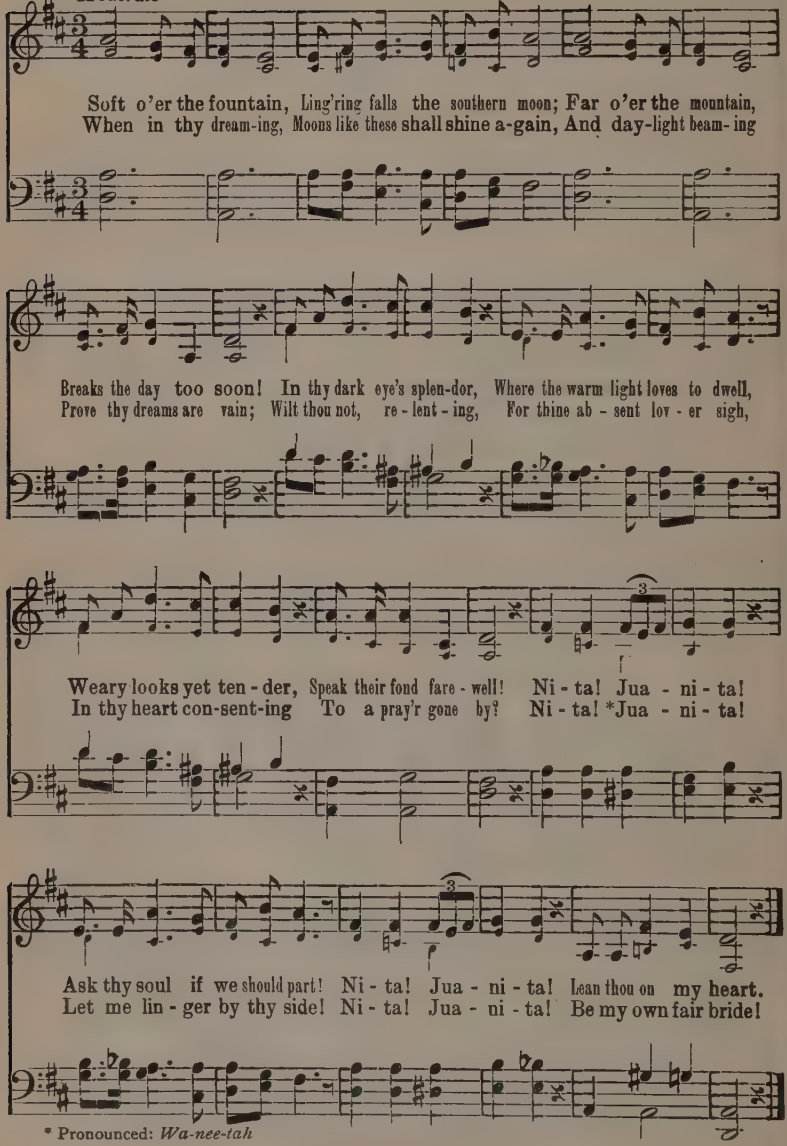
THE BEAR WENT OVER THE MOUNTAIN

𝄆: The bear went over the mountain, 𝄇 the bear went over the mountain,
To see what he could see!
𝄆: And all that he could see, 𝄇 was—
𝄆: The other side of the mountain, 𝄇 the other side of the mountain,
Was all that he could see!

JUANITA

CAROLINE NORTON — Spanish Melody

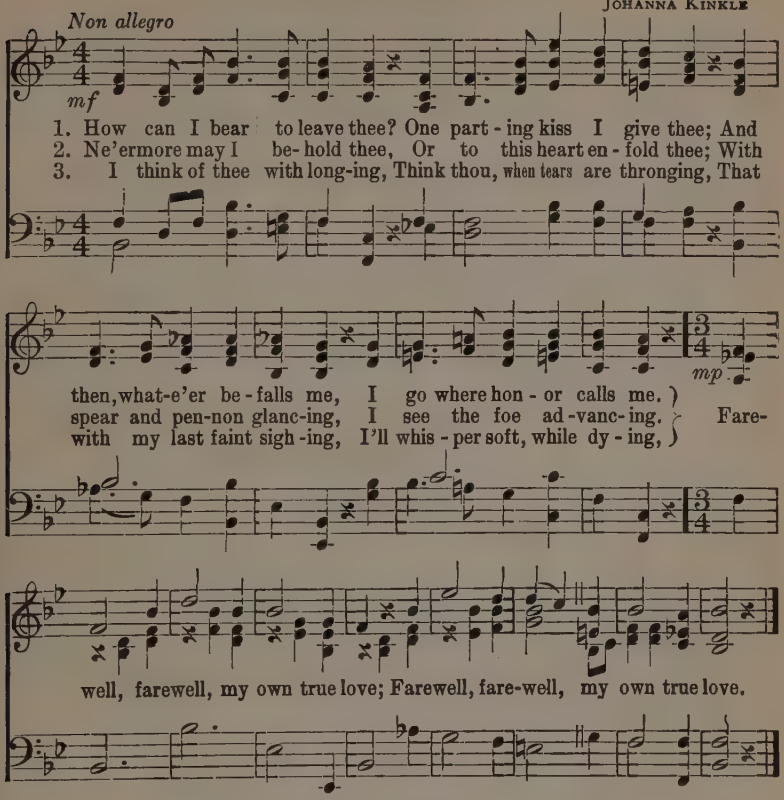
Moderato


Soft o'er the fountain, Ling'ring falls the southern moon; Far o'er the mountain,
When in thy dream-ing, Moons like these shall shine a-gain, And day-light beam-ing
Breaks the day too soon! In thy dark eye's splen-dor, Where the warm light loves to dwell,
Prove thy dreams are vain; Wilt thou not, re-lent-ing, For thine ab-sent lov-er sigh,
Weary looks yet ten-der, Speak their fond fare-well! Ni-ta! Jua-ni-ta!
In thy heart con-sent-ing To a pray'r gone by? Ni-ta! *Jua-ni-ta!
Ask thy soul if we should part! Ni-ta! Jua-ni-ta! Lean thou on my heart.
Let me lin-ger by thy side! Ni-ta! Jua-ni-ta! Be my own fair bride!

* Pronounced: *Wa-nee-tah*

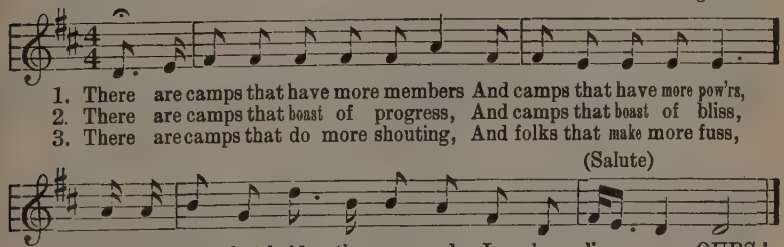
SOLDIER'S FAREWELL

JOHANNA KINKLE


Non allegro
mf
1. How can I bear to leave thee? One part - ing kiss I give thee; And
2. Ne'ermore may I be- hold thee, Or to this heart en - fold thee; With
3. I think of thee with long-ing, Think thou, when tears are thronging, That
then, what-e'er be - falls me, I go where hon - or calls me.
spear and pen-non glanc-ing, I see the foe ad -vanc- ing.
with my last faint sigh -ing, I'll whis - per soft, while dy - ing,
Fare-
mp
well, farewell, my own true love; Farewell, fare-well, my own true love.

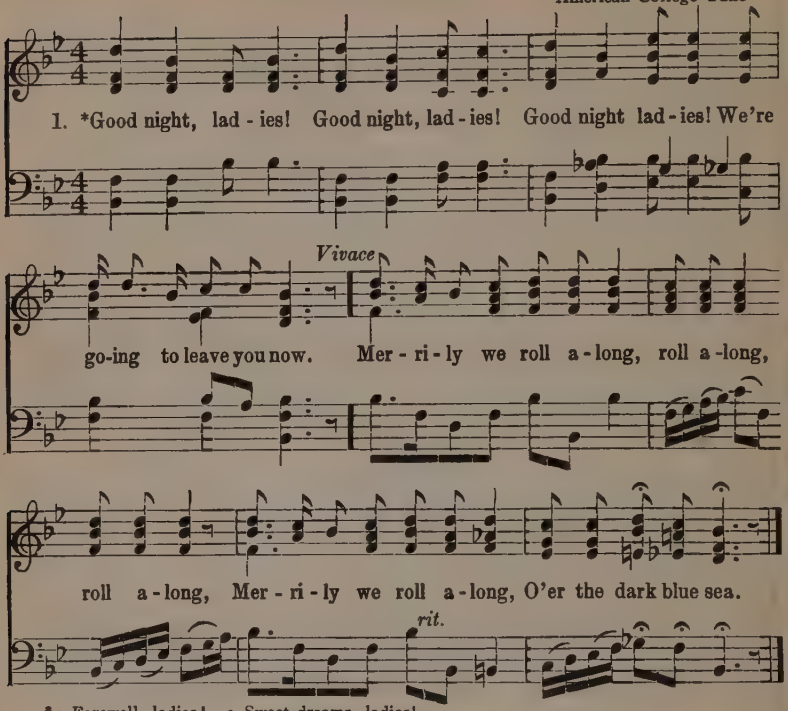
BELIEVE ME, WE

College Air


1. There are camps that have more members And camps that have more pow'rs,
2. There are camps that boast of progress, And camps that boast of bliss,
3. There are camps that do more shouting, And folks that make more fuss,
(Salute)
But the camp that holds the rec - ord Is— be - lieve me—OURS!
But the camp that holds the rec - ord Is— be - lieve me—THIS!
But the folks that hold the rec - ord Are— be - lieve me— US!

GOOD-NIGHT, LADIES

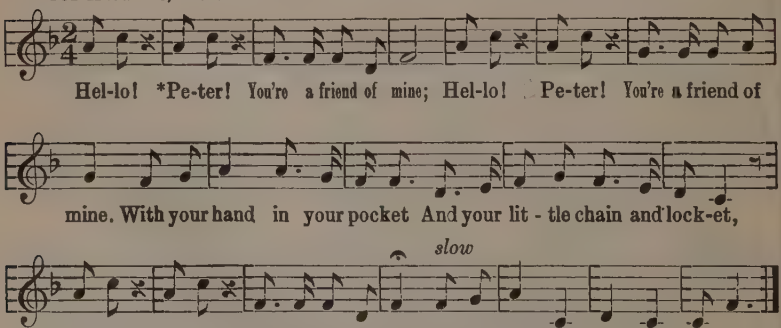
American College Tune


1. *Good night, lad - ies! Good night, lad - ies! Good night lad - ies! We're
Vivace
go-ing to leave you now. Mer - ri - ly we roll a - long, roll a - long,
roll a - long, Mer - ri - ly we roll a - long, O'er the dark blue sea.
rit.

*2 Farewell, ladies! 3 Sweet dreams, ladies!

YOU'RE A FRIEND OF MINE

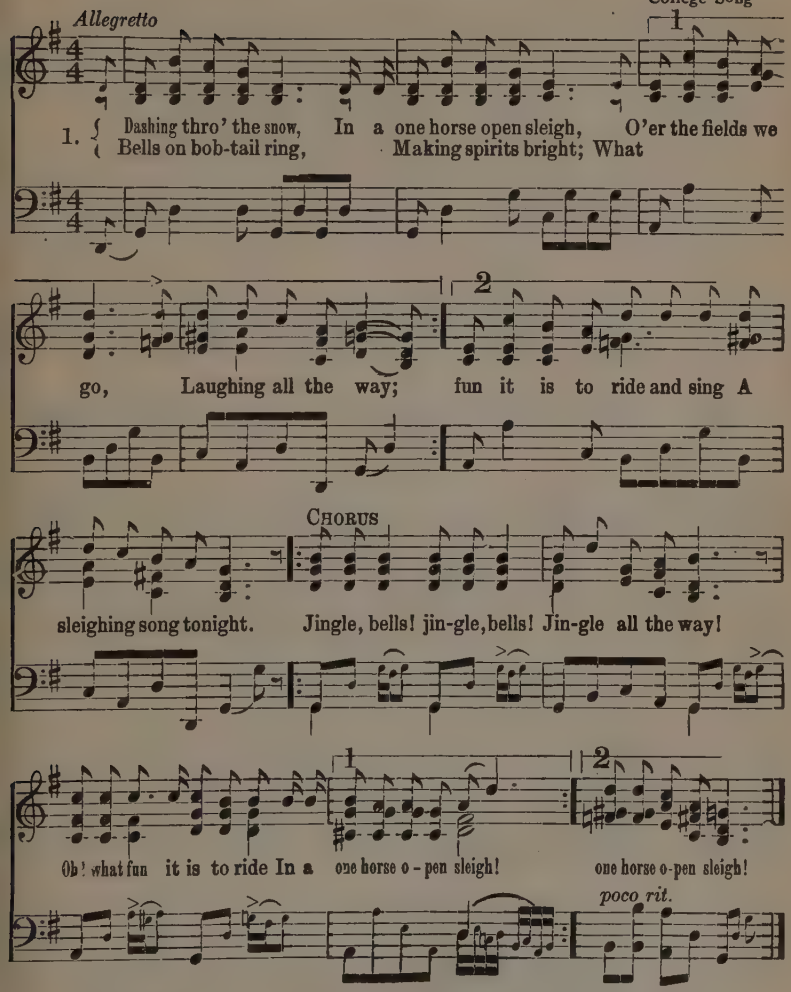
"You Know Me, Al.":


Hel-lo! *Pe-ter! You're a friend of mine; Hel-lo! Pe-ter! You're a friend of
mine. With your hand in your pocket And your lit - tle chain and lock-et,
slow
Hel-lo! Pe-ter! You're a friend of mine. And he lives down in our al-ley.

*Other names as desired.

JINGLE, BELLS

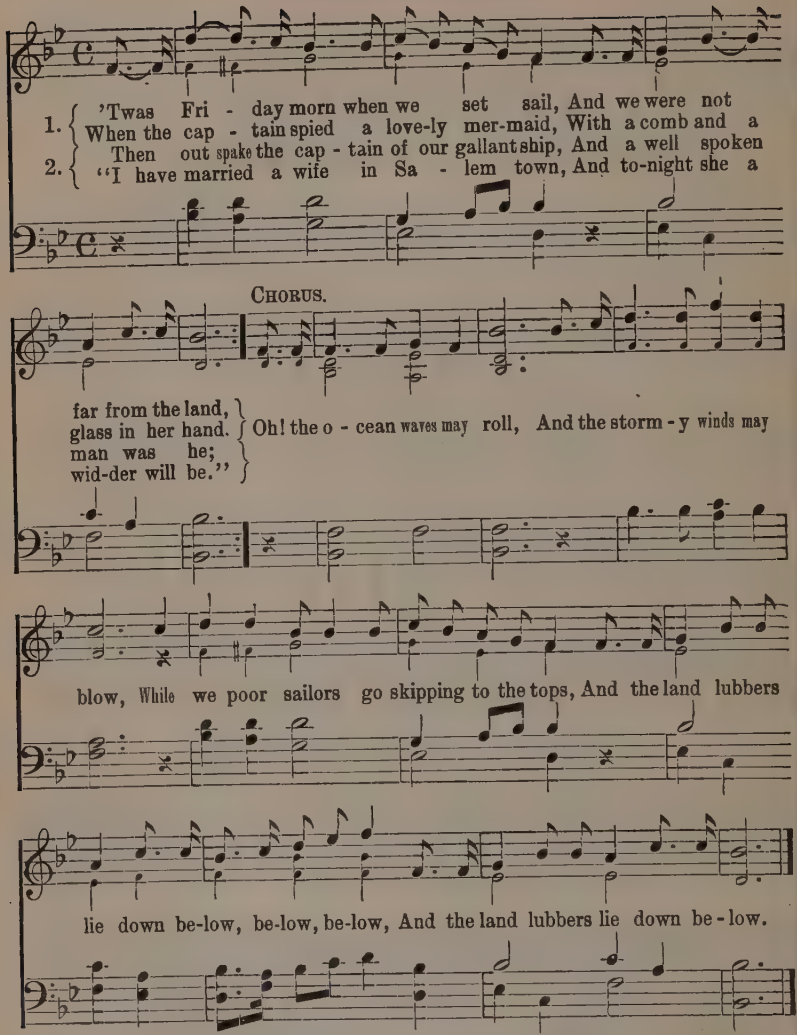
College Song


Allegretto
1
1. Dashing thro' the snow, In a one horse open sleigh, O'er the fields we
Bells on bob-tail ring, Making spirits bright; What
2
go, Laughing all the way; fun it is to ride and sing A
Chorus
sleighing song tonight. Jingle, bells! jin-gle, bells! Jin-gle all the way!
1
2
Oh! what fun it is to ride In a one horse o-pen sleigh! one horse o-pen sleigh!
poco rit.

2 A day or two ago
I thought I'd take a ride,
And soon Miss Fannie Bright
Was seated by my side;
The horse was lean and lank,
Misfortune seem'd his lot;
He got into a drifted bank,
And we, we got up-sot.

3 Now the ground is white;
Go it while you're young,
Take the girls to-night,
And sing this sleighing song;
Just get a bob-tail'd bay,
Two forty for his speed,
Then hitch him to an open sleigh,
And crack! you'll take the lead.

THE MERMAID


1. 'Twas Fri - day morn when we set sail, And we were not
When the cap - tain spied a love-ly mer-maid, With a comb and a
2. Then out spake the cap - tain of our gallant ship, And a well spoken
"I have married a wife in Sa - lem town, And to-night she a
CHORUS.
far from the land,
glass in her hand.
man was he;
wid-der will be."
Oh! the o - cean waves may roll, And the storm - y winds may
blow, While we poor sailors go skipping to the tops, And the land lubbers
lie down be-low, be-low, be-low, And the land lubbers lie down be - low.

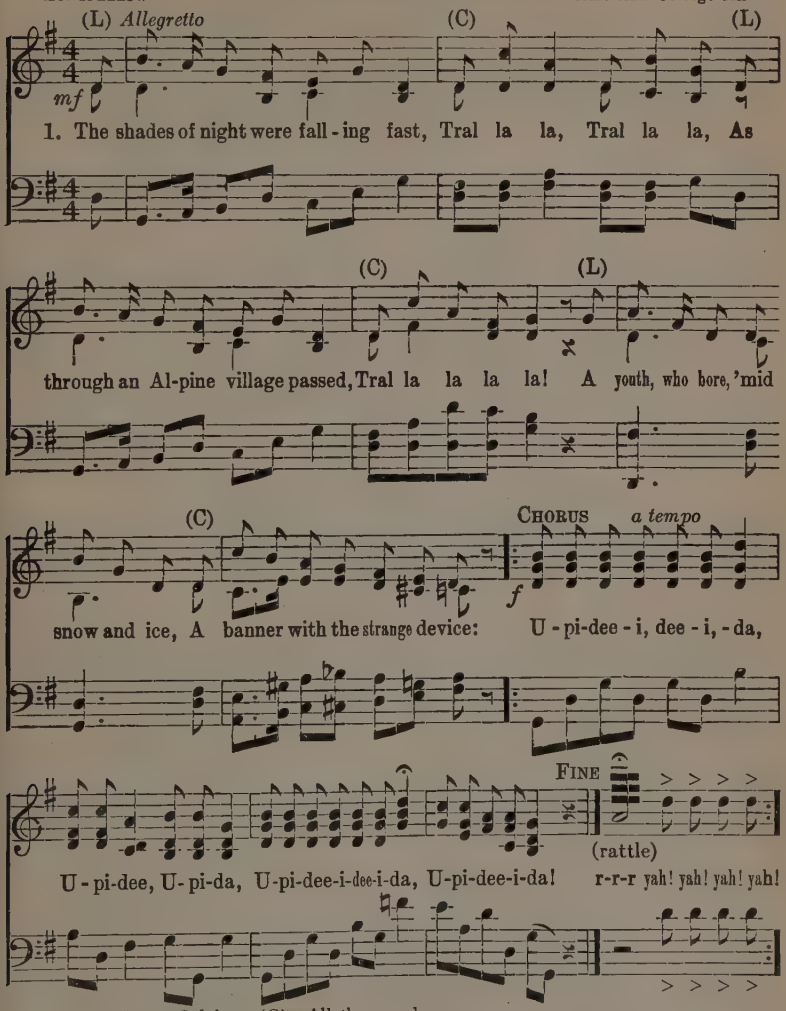
3 Then out spake the cook of our gallant ship,
And a fat old cookie was he:
"I care much more for my pottles and my kets,
Than I do for the depths of the sea."—CHO.

4 Then three times around went our gallant ship,
And three times around went she;
Then three times around went our gallant ship,
And she sank to the depths of the sea.—CHO.

UPIDEE

LONGFELLOW

American College Air


(L) Allegretto
(C)
(L)
mf
1. The shades of night were fall - ing fast, Tral la la, Tral la la, As
(C)
(L)
through an Al-pine village passed, Tral la la la la! A youth, who bore, 'mid
(C)
CHORUS a tempo
f
snow and ice, A banner with the strange device: U - pi-dee - i, dee - i, - da,
FINE
(rattle)
U - pi-dee, U - pi-da, U-pi-dee-i-dee-i-da, U-pi-dee-i-da! r-r-r yah! yah! yah! yah!

(L)—Leader or Soloist; (C)—All the crowd

2 His brow was sad, his eye beneath, Tra-etc.
Flashed like a faulchion from its sheaf, Tra-etc.
And like a silver clarion rung
The accents of that unknown tongue:—CHO.

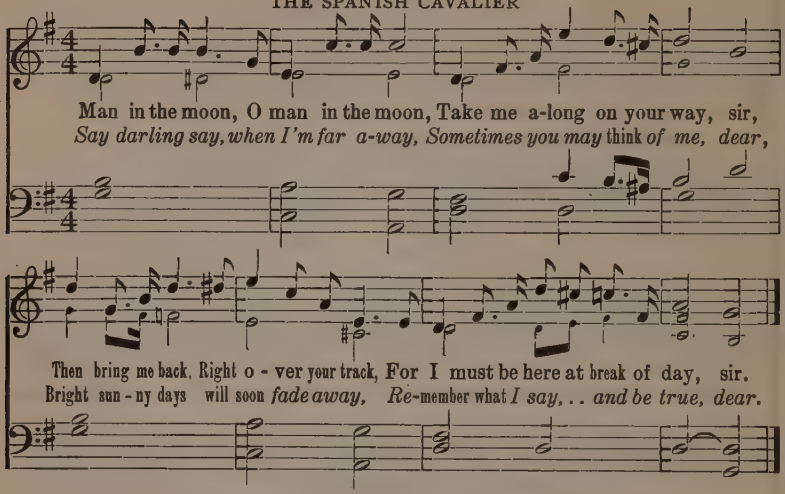
3 "O stay," the maiden said, "and rest," Tra-etc.
"Thy weary head upon this breast," Tra-etc.
A tear stood in his bright blue eye,
But still he answered with a sigh:—CHO.

4 At break of day as heavenward, Tra-etc.
The pious monks of Saint Bernard, Tra-etc.
Uttered the oft repeated prayer,
A voice cried through the startled air:—CHO.

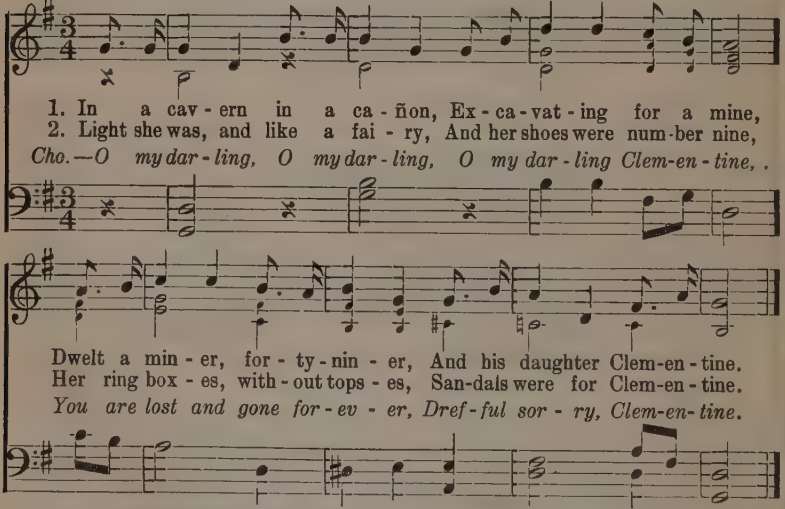
5 A traveller, by the faithful hound, Tra-etc.
Half buried in the snow was found, Tra-etc.
Still grasping in his hand of ice
That banner with the strange device:—CHO.

MAN IN THE MOON

THE SPANISH CAVALIER


Man in the moon, O man in the moon, Take me a-long on your way, sir,
Say darling say, when I'm far a-way, Sometimes you may think of me, dear,
Then bring me back, Right o - ver your track, For I must be here at break of day, sir.
Bright sun - ny days will soon fade away, Re-member what I say, . . and be true, dear.

O MY DARLING CLEMENTINE


1. In a cav - ern in a ca - ñon, Ex - ca - vat - ing for a mine,
2. Light she was, and like a fai - ry, And her shoes were num - ber nine,
Cho.—O my dar - ling, O my dar - ling, O my dar - ling Clem-en - tine, .
Dwelt a min - er, for - ty - nin - er, And his daughter Clem-en - tine.
Her ring box - es, with - out tops - es, San-dals were for Clem-en - tine.
You are lost and gone for - ev - er, Dref - ful sor - ry, Clem-en-tine.

3 Drove she ducklings to the water,
Ev'ry morning just at nine,
Hit her foot against a splinter,
Fell into the foaming brine.—Cho.

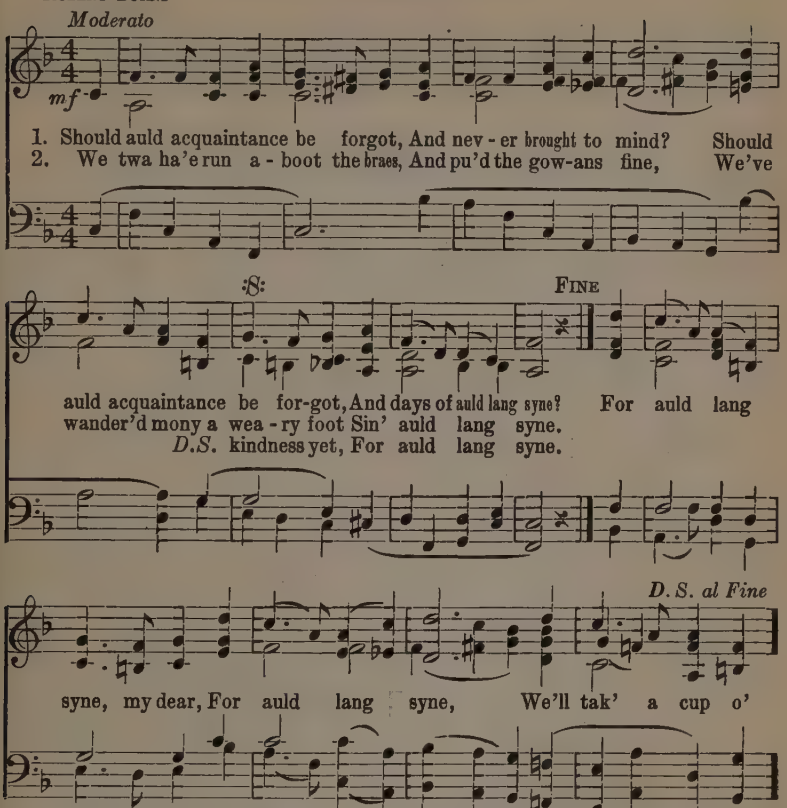
4 Ruby lips above the water,
Blowing bubbles soft and fine,
Alas, for me! I was no swimmer,
So I lost my Clementine.—Cho.

5 In a church-yard near the cañon,
Where the myrtle doth entwine,
There grow roses, and other posies,
Fertilized by Clementine.—Cho.

6 Then the miner, forty niner,
Soon began to peak and pine,
Thought he "oughter" join his daughter,
Now he's with his Clementine.—Cho.

AULD LANG SYNE

ROBERT BURNS


Moderato
mf
1. Should auld acquaintance be forgot, And nev - er brought to mind? Should
2. We twa ha'e run a - boot the braes, And pu'd the gow-ans fine, We've
:S:
FINE
auld acquaintance be for-got, And days of auld lang syne? For auld lang
wander'd mony a wea - ry foot Sin' auld lang syne.
D.S. kindness yet, For auld lang syne.
D. S. al Fine
syne, my dear, For auld lang syne, We'll tak' a cup o'

3 We twa ha'e sported i' the burn,
Frae mornin' sun till dine,
But seas between us braid ha'e roared
Sin' auld lang syne.

4 And here's a hand, my trusty frien',
And gie's a hand o' thine,
We'll tak' a cup o' kindness yet,
For auld lang syne.

BOHUNKUS

To be sung to the first half of the tune "Auld Lang Syne"

1 There was a farmer had two sons,
And these two sons were brothers;
Bohunkus was the name of one,
Josephus was the other's.

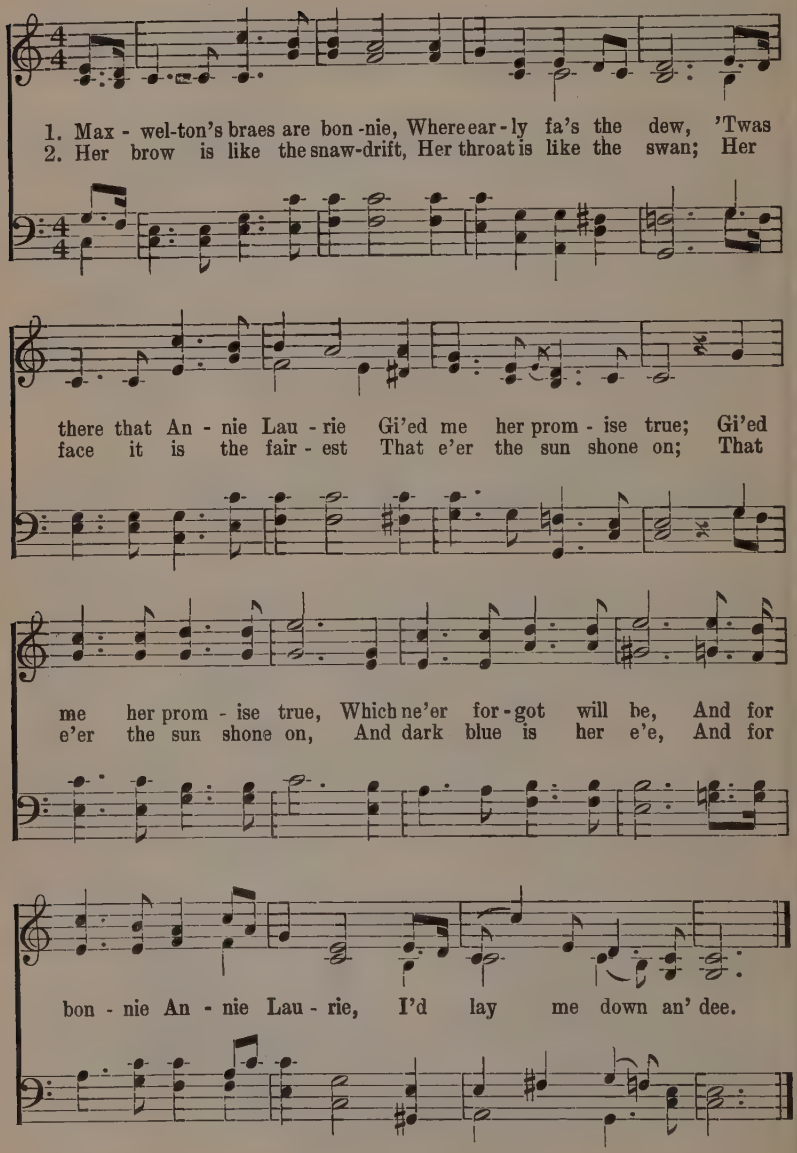
2 Now, these two boys had suits of clothes,
And they were made for Sunday;
Bohunkus wore his every day,
Josephus, his on Monday.

3 Now, these two boys to the theater went,
Whenever they saw fit;
Bohunkus in the gallery sat,
Josephus in the pit.

4 Now, these two boys are dead and gone—
Long may their ashes rest!
Bohunkus of the cholera died,—
Josephus by request.

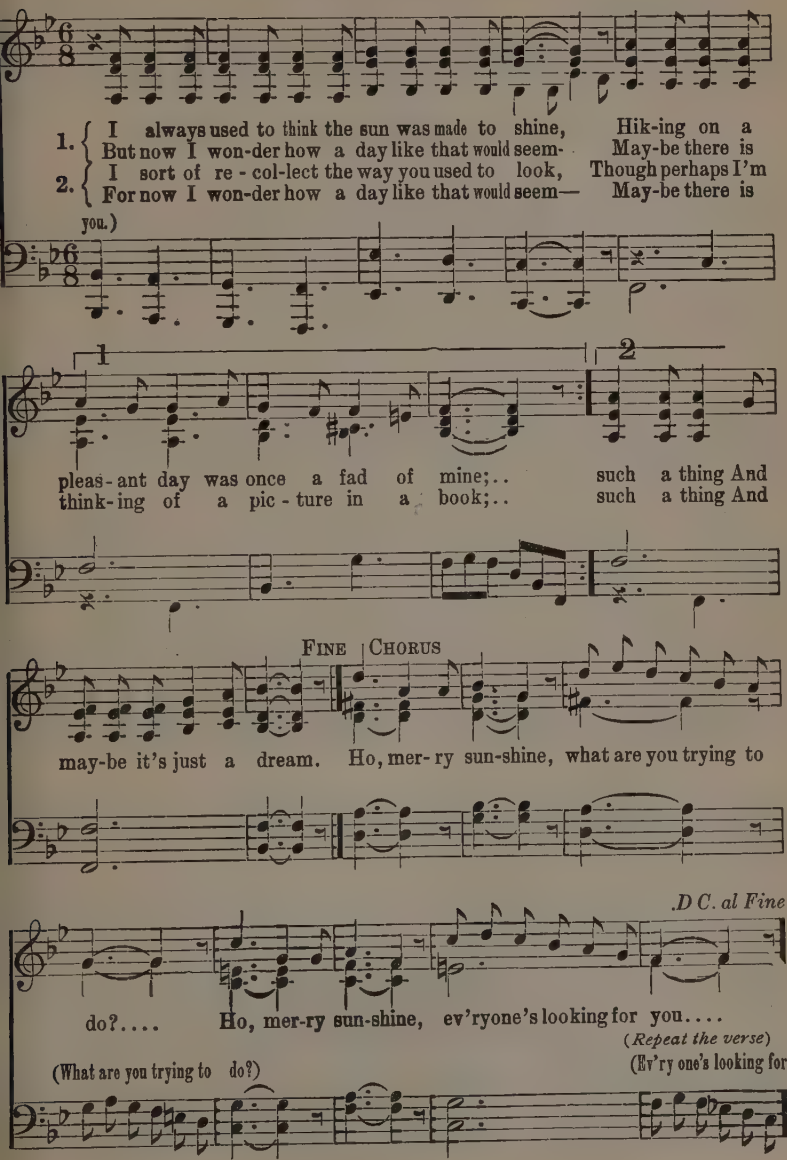
5 Now, these two boys their story told
And they did tell it well:
Bohunkus, he to heaven went,
Josephus went to—Sing-sing.

ANNIE LAURIE

Lady John Scott

1. Max - wel-ton's braes are bon - nie, Where ear - ly fa's the dew, 'Twas
2. Her brow is like the snaw-drift, Her throat is like the swan; Her
there that An - nie Lau - rie Gi'ed me her prom - ise true; Gi'ed
face it is the fair - est That e'er the sun shone on; That
me her prom - ise true, Which ne'er for - got will be, And for
e'er the sun shone on, And dark blue is her e'e, And for
bon - nie An - nie Lau - rie, I'd lay me down an' dee.

MERRY SUNSHINE

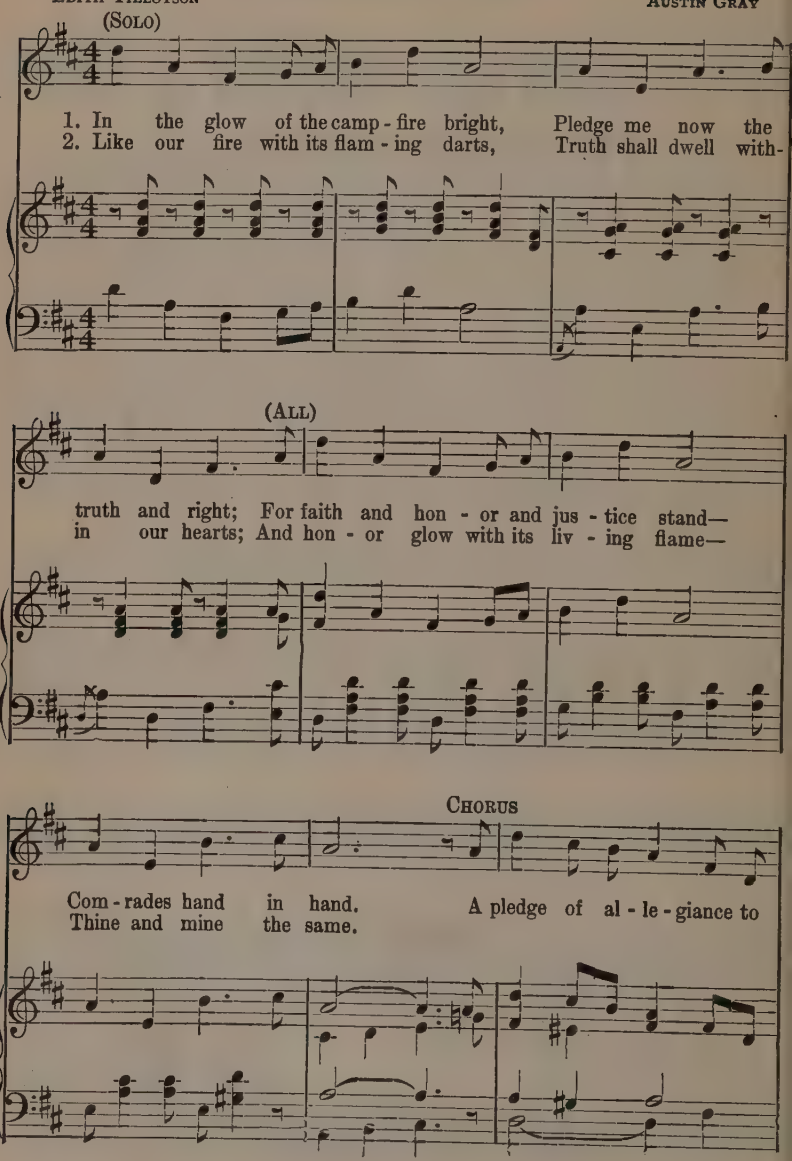
EDITH TILLOTSON (FOR A STORMY DAY) Tune: "Solomon Levi"

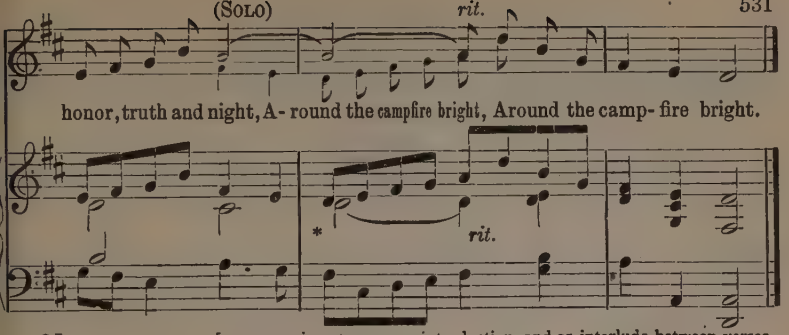

1. I always used to think the sun was made to shine, Hik-ing on a
But now I won-der how a day like that would seem- May-be there is
2. I sort of re - col-lect the way you used to look, Though perhaps I'm
For now I won-der how a day like that would seem— May-be there is
you.)
1
2
pleas-ant day was once a fad of mine;.. such a thing And
think-ing of a pic-ture in a book;.. such a thing And
FINE CHORUS
may-be it's just a dream. Ho, mer-ry sun-shine, what are you trying to
D C. al Fine
do?.... Ho, mer-ry sun-shine, ev'ryone's looking for you....
(Repeat the verse)
(What are you trying to do?)
(Ev'ry one's looking for

CAMP-FIRE PLEDGE

EDITH TILLOTSON

AUSTIN GRAY


(SOLO)
1. In the glow of the camp - fire bright, Pledge me now the
2. Like our fire with its flam - ing darts, Truth shall dwell with-
(ALL)
truth and right; For faith and hon - or and jus - tice stand—
in our hearts; And hon - or glow with its liv - ing flame—
CHORUS
Com - rades hand in hand. A pledge of al - le - giance to
Thine and mine the same.

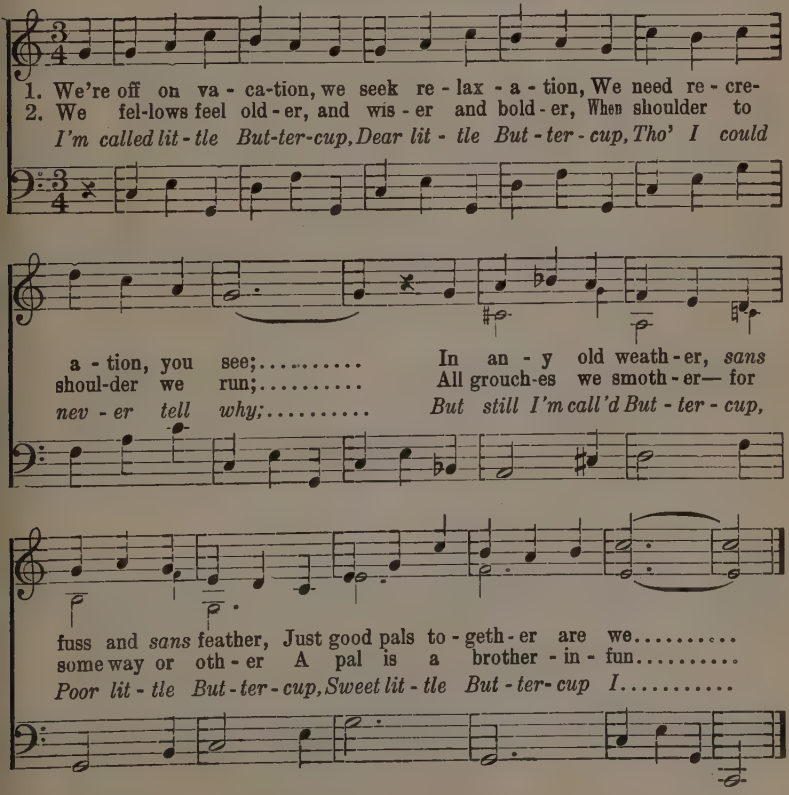


* Last two measures of accompaniment serve as introduction, and as interlude between verses.

PALS

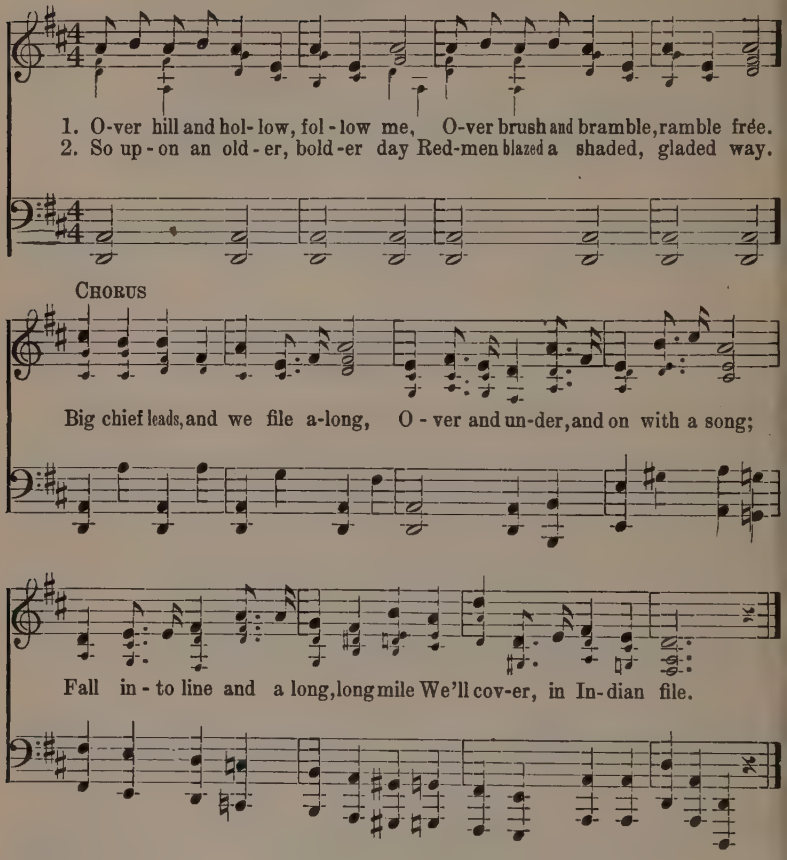
LITTLE BUTTERCUP

Arthur Sullivan


1. We're off on va - ca-tion, we seek re - lax - a - tion, We need re - cre-
2. We fel-lows feel old - er, and wis - er and bold - er, When shoulder to
I'm called lit - tle But-ter-cup, Dear lit - tle But - ter - cup, Tho' I could
a - tion, you see;.....
shoul-der we run;.....
nev - er tell why;.....
In an - y old weath - er, sans
All grouch-es we smoth - er— for
But still I'm call'd But - ter - cup,
fuss and sans feather, Just good pals to - geth - er are we.....
some way or oth - er A pal is a brother - in - fun.....
Poor lit - tle But - ter - cup, Sweet lit - tle But - ter- cup I.....

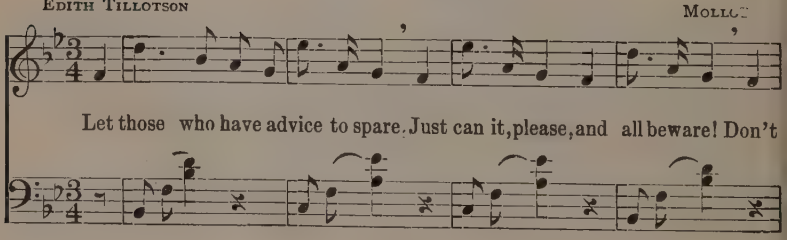
INDIAN FILE

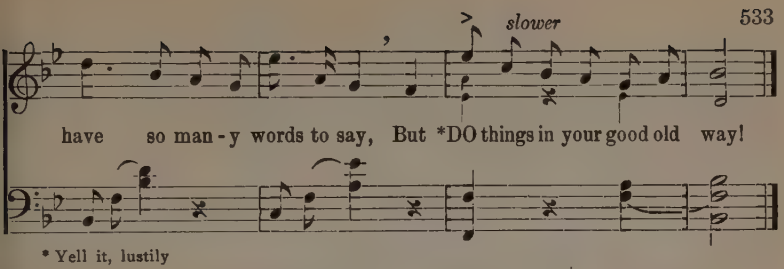
EDITH TILLOTSON — AUSTIN GRAY


1. O-ver hill and hol- low, fol - low me, O-ver brush and bramble, ramble frée.
2. So up - on an old - er, bold - er day Red-men blazed a shaded, gladed way.
CHORUS
Big chief leads, and we file a-long, O - ver and un-der, and on with a song;
Fall in - to line and a long, long mile We'll cov-er, in In-dian file.

TO OUR CRITICS

EDITH TILLOTSON — MOLLOY



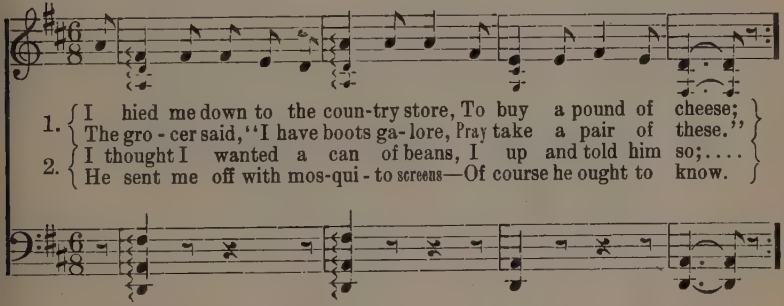


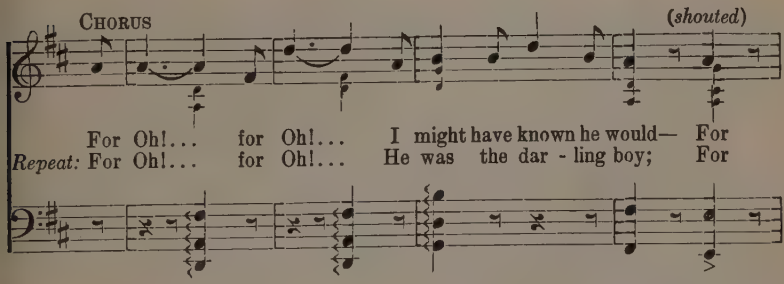
* Yell it, lustily

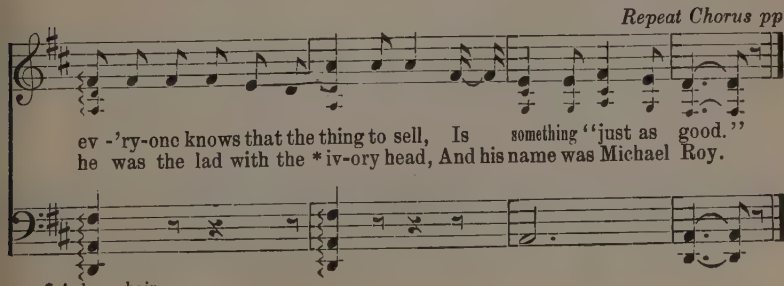
JUST AS GOOD

EDITH TILLOTSON

Tune: "Michael Roy"


1. I hied me down to the coun-try store, To buy a pound of cheese;
The gro - cer said, "I have boots ga-lore, Pray take a pair of these."
2. I thought I wanted a can of beans, I up and told him so;....
He sent me off with mos-qui - to screens—Of course he ought to know.

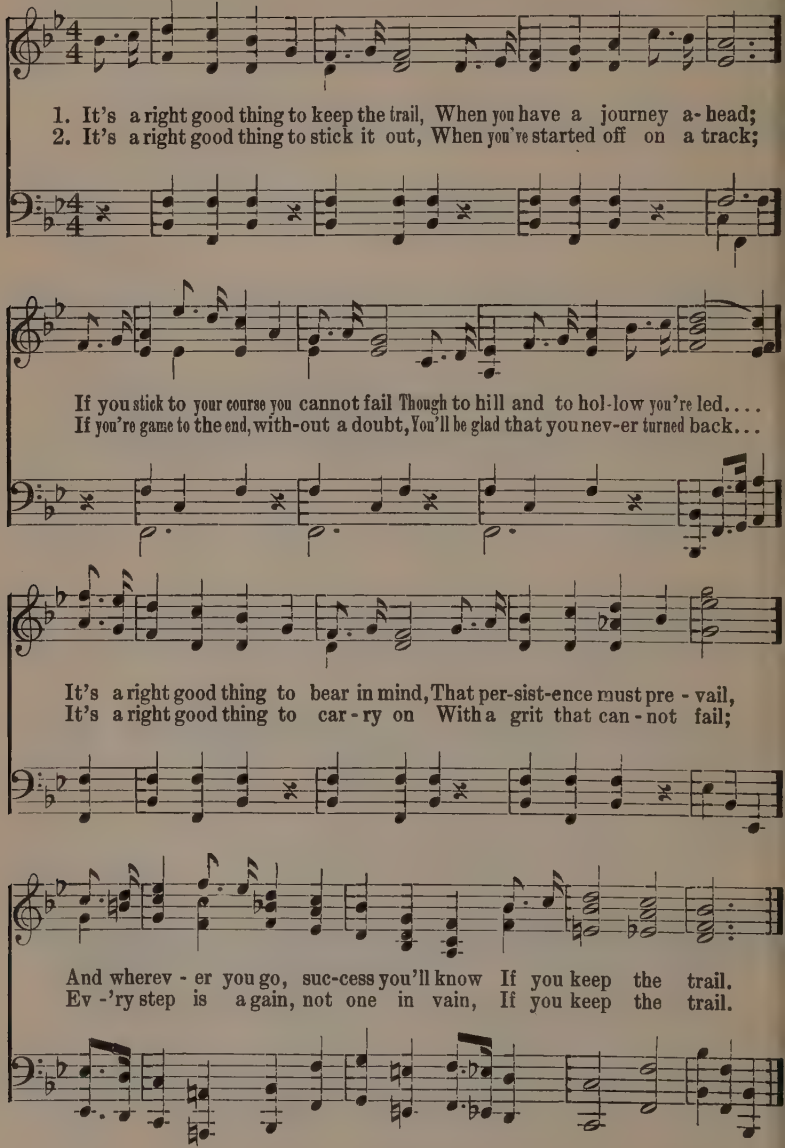



Repeat Chorus pp
ev -'ry-one knows that the thing to sell, Is something "just as good."
he was the lad with the * iv-ory head, And his name was Michael Roy.

* Auburn hair

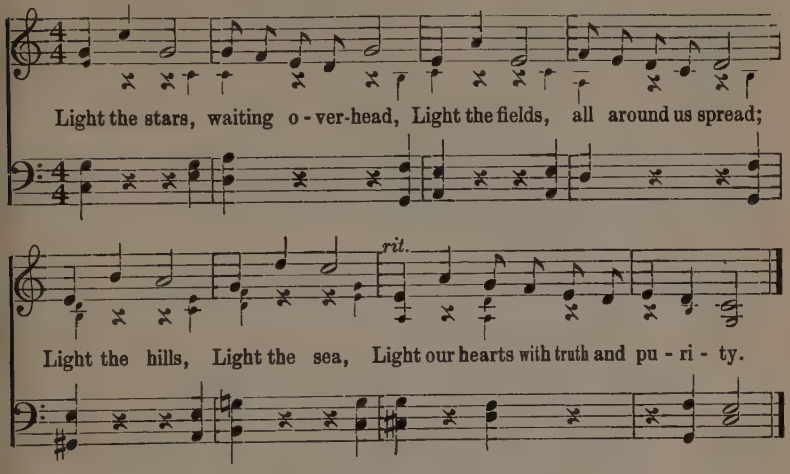
KEEP THE TRAIL

EDITH TILLOTSON AUSTIN GRAY


1. It's a right good thing to keep the trail, When you have a journey a-head;
2. It's a right good thing to stick it out, When you've started off on a track;
If you stick to your course you cannot fail Though to hill and to hol-low you're led....
If you're game to the end, with-out a doubt, You'll be glad that you nev-er turned back...
It's a right good thing to bear in mind, That per-sist-ence must pre - vail,
It's a right good thing to car - ry on With a grit that can - not fail;
And wherev - er you go, suc-cess you'll know If you keep the trail.
Ev -'ry step is a gain, not one in vain, If you keep the trail.

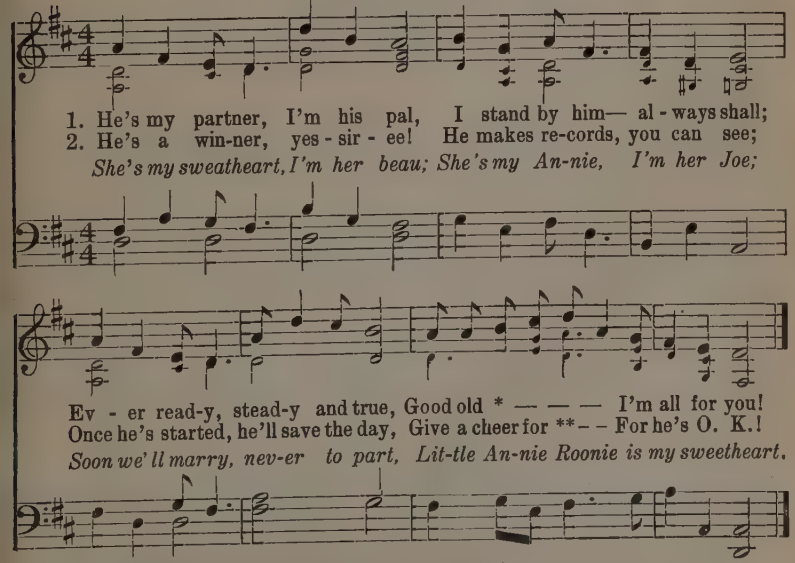
CAMP-FIRE INVOCATION

EDITH TILLOTSON


Light the stars, waiting o - ver-head, Light the fields, all around us spread;
rit.
Light the hills, Light the sea, Light our hearts with truth and pu - ri - ty.

I'M ALL FOR YOU

ANNIE ROONEY

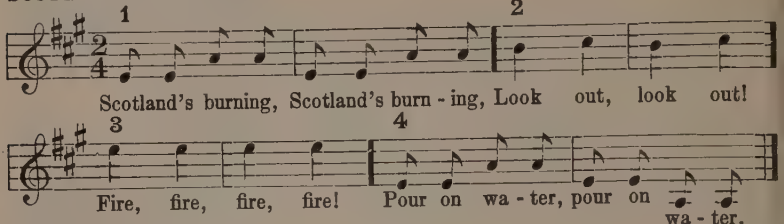

1. He's my partner, I'm his pal, I stand by him— al - ways shall;
2. He's a win-ner, yes - sir - ee! He makes re-cords, you can see;
She's my sweatheart, I'm her beau; She's my An-nie, I'm her Joe;
Ev - er read-y, stead-y and true, Good old * — — — I'm all for you!
Once he's started, he'll save the day, Give a cheer for ** — — For he's O. K.!
Soon we' ll marry, nev-er to part, Lit-tle An-nie Roonie is my sweetheart.

1. (To start cheering) * Jimmy Johnson, *or* Prexy Harris, etc.
2. (During sports) ** Walter, etc.

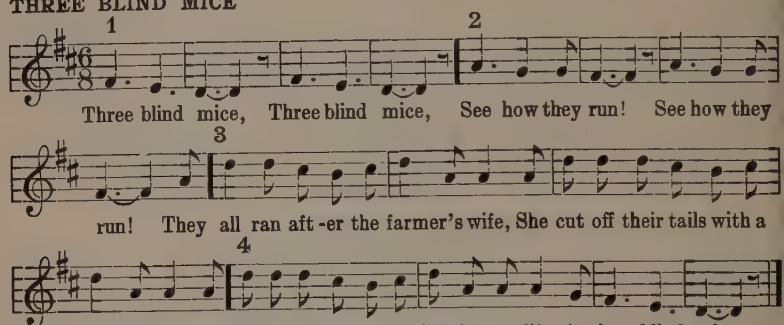
ROUNDS

Divide the company into four sections, each section in succession commencing at the first division of the music (1), when the previous section has reached the second division (2).

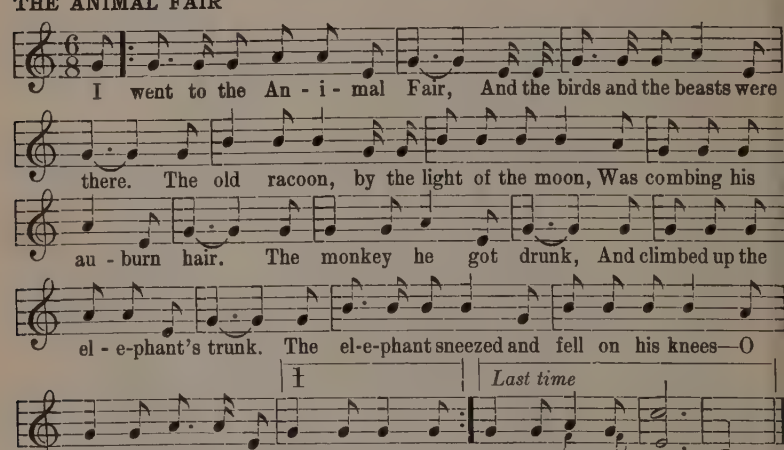
SCOTLAND'S BURNING



THREE BLIND MICE


1
2
Three blind mice, Three blind mice, See how they run! See how they
3
run! They all ran aft - er the farmer's wife, She cut off their tails with a
4
carving knife, Did ev - er you see such a sight in your life As three blind mice.

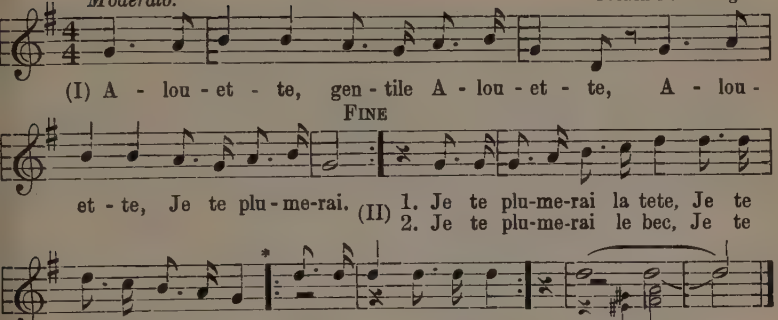
THE ANIMAL FAIR


I went to the An - i - mal Fair, And the birds and the beasts were
there. The old racoon, by the light of the moon, Was combing his
au - burn hair. The monkey he got drunk, And climbed up the
el - e-phant's trunk. The el-e-phant sneezed and fell on his knees—O
1
Last time
what be-came of the mon-key, mon-* I mon - key, mon-key, mon - key.

*The first section continues to monotone on G, "monkey, monkey," while the second section sings from the beginning; etc.

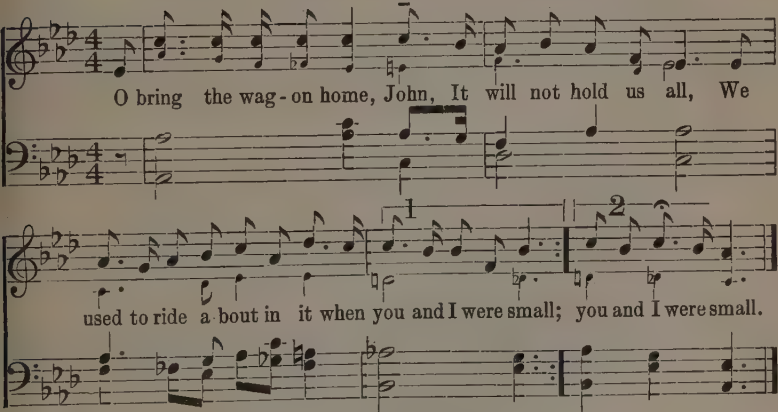
ALOUETTE

Moderato. French Folk Song


(I) A - lou - et - te, gen - tile A - lou - et - te, A - lou -
FINE
et - te, Je te plu - me-rai. (II) 1. Je te plu-me-rai la tete, Je te
2. Je te plu-me-rai le bec, Je te
plu-me-rai la tete, (L) 1. Et la tete, (C) et la tete. (L) Oh! (C) Oh!.....
plu-me - rai le bec, 2. Et le bec, et la bec, D.C. al Fine.
Et la tete, et la tete,

L–leader; C–crowd; I–half of the crowd; II–other half.
Verses; 3. Le nez; 4. Le dos; 5. Les pattes; 6. Le cou.
* In each verse, after the first one, repeat here in reverse order all of the words used in the previous verses. Thus the last verse will be:
(Leader) *et la cou,* (Crowd) et la cou; *et les pattes,* etc.; *le dos; le nez; le bec; la tete;* (Leader) *Oh!* (Crowd) Oh!—then: *D. C. al fine.*

BRING THE WAGON HOME



SET THE CAMP-FIRE BURNING

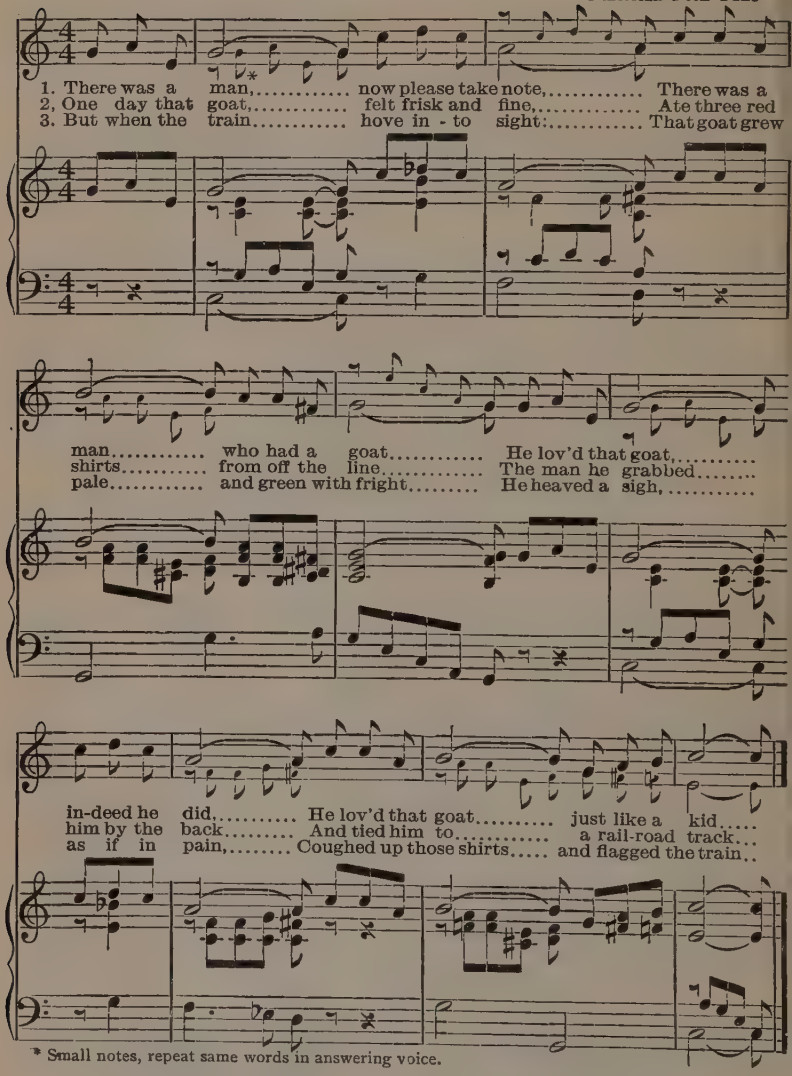
1 O set the camp-fire burning,
Let's sit around the blaze, and
Store some right good memories up
To use in coming days.

2 As sure as time and taxes,
There'll be a by-and-by,
When we'll be looking down the years.
To see with memory's eye—

CHORUS

A picture of good comrades,
With faces all alight,
Who sat beneath the stars and sang
Around the camp-fire bright.

THE GOAT

American Folk Tune

1. There was a man, now please take note, There was a
2, One day that goat, felt frisk and fine, Ate three red
3. But when the train hove in - to sight: That goat grew
man, who had a goat, He lov'd that goat,
shirts from off the line. The man he grabbed
pale and green with fright. He heaved a sigh,
in-deed he did. He lov'd that goat just like a kid
him by the back. And tied him to a rail-road track
as if in pain, Coughed up those shirts and flagged the train

* Small notes, repeat same words in answering voice.

IF I WERE YOU

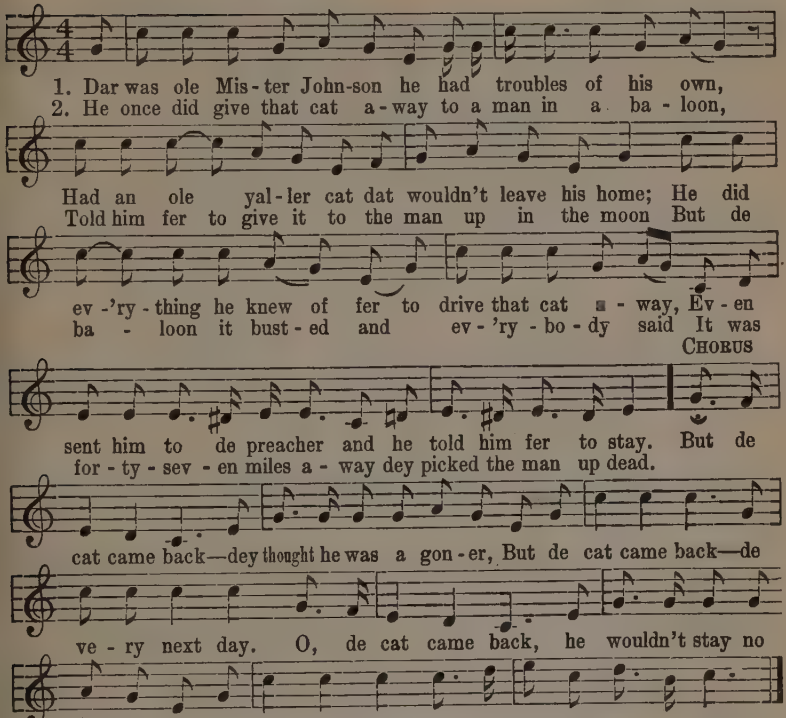
If you were I, if I were you,
I wonder what we two might do!
If you were I, I'd be right near,
If I were you, you'd be right here.

ONLY A COCK CAN CROW

A flea can flee, a fly can fly.
A bee can be as well as I.
A duck can duck, but even so—
Oh, sad his lot—a crow can't crow

THE CAT CAME BACK

American Folk Tune


1. Dar was ole Mis-ter John-son he had troubles of his own,
2. He once did give that cat a-way to a man in a ba-loon,
Had an ole yal-ler cat dat wouldn't leave his home; He did
Told him fer to give it to the man up in the moon But de
ev-'ry-thing he knew of fer to drive that cat a-way, Ev-en
ba-loon it bust-ed and ev-'ry-bo-dy said It was
CHORUS
sent him to de preacher and he told him fer to stay. But de
for-ty-sev-en miles a-way dey picked the man up dead.
cat came back—dey thought he was a gon-er, But de cat came back—de
ve-ry next day. O, de cat came back, he wouldn't stay no
long-er O, de cat came back 'cause he couldn't stay a-way.

3 Dat cat it was a terror and he thought it was de best
To give it to a nigger who was going out West;
But de train in going round a curve, struck a broken rail;
Not a blessed soul aboard dat train came back to tell the tale.

4 A man down on de corner swore he'd kill dat cat on sight,
Loaded up a musket full of nails and dynamite.
He waited in de garden fer de cat to come around,
Half a dozen little pieces of de man was all they found.

5 A little boy took dat cat away, he got a dollar note,
Took him down the ribber in a little open boat,
Tied a rock around his neck dat weighed about ten pound,
Now dey's fishing in de ribber for a little boy dat's drowned.

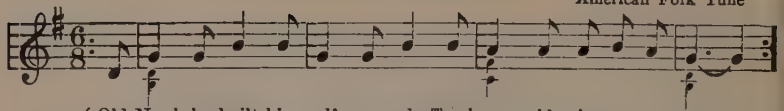
6 Dat cat once did have company out in de back yard,
Someone frowed a boot jack and dey frowed it mighty hard,
Hit dat cat behind de ear, he thought it rather slight
When along dar came a brick bat dat knocked him out of sight.

7 Away across de ocean dey did send that cat at last
De ship it struck an awful storm and it was sinking fast
Folks dey started praying when de boat begin to toss
When along dar came anudder boat and took the people off.

8 De cat came back, dey thought he was a goner
But the cat came back, de very next day;
And de cat's dare yet and I guess he'll stay some longer;
Yes, de cat's dare yet cause he wouldn't stay away.

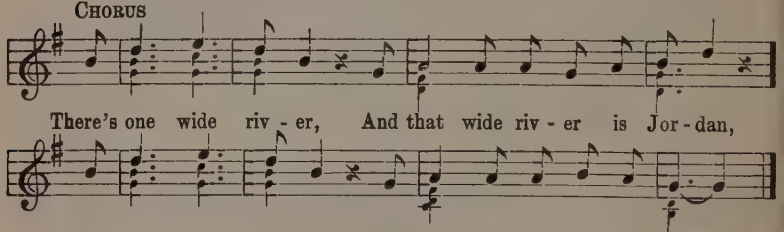
NOAH'S ARK

American Folk Tune



1. { Old Noah he built him-self an ark, There's one wide riv - er to cross
   { He built it all of hick-'ry bark, There's one wide riv - er to cross.
2. { The animals went in, one by one, There's one wide riv - er to cross
   { And Ja - phet with his big bass drum, There's one wide riv - er to cross.

CHORUS



There's one wide riv - er, And that wide riv - er is Jor - dan,
There's one wide riv - er, There's one wide riv - er to cross.

2
The animals went in two by two, There's
The elephant and the kangaroo, There's

4
The animals went in three by three, There's
The hippopotamus and the bumblebee, There's

5
The animals went in five by five, There's
Shem, Ham, Japhet, and their wives, There's

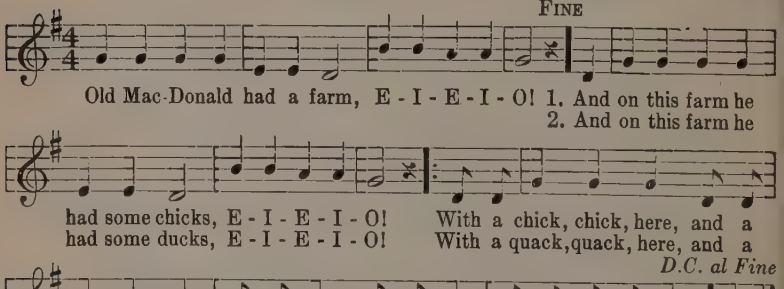
6
And when he found he had no sail There's
He just ran up his old coat-tail, There's

7
And as they talked of this and that, There's
The ark it bumped on Ararat, There's

8
Then old Noah went on a spree, There's
And banished Ham to Afrikee, There's

OLD MACDONALD HAD A FARM

FINE



Old Mac-Donald had a farm, E - I - E - I - O! 1. And on this farm he had some chicks, E - I - E - I - O! With a chick, chick, here, and a
2. And on this farm he had some ducks, E - I - E - I - O! With a quack, quack, here, and a

D.C. al Fine

chick, chick, there, Here a chick, there a chick, Ev - 'rywhere a chick, chick.
quack, quack, there, Here a quack, there a quack, Ev - 'rywhere a quack,* quack.

3. Turkey (gobble-gobble). 4. Pig (hoink-hoink), 5. Ford (Rattle-rattle).

*At this point, each verse, after the first, repeats in reverse order all the material of the preceding verses in these four measures. Thus the fifth verse would be: With a rattle-rattle here, etc.; with a hoink-hoink; gobble gobble; quack-quack; chick-chick;—then *D.C. al Fine.*

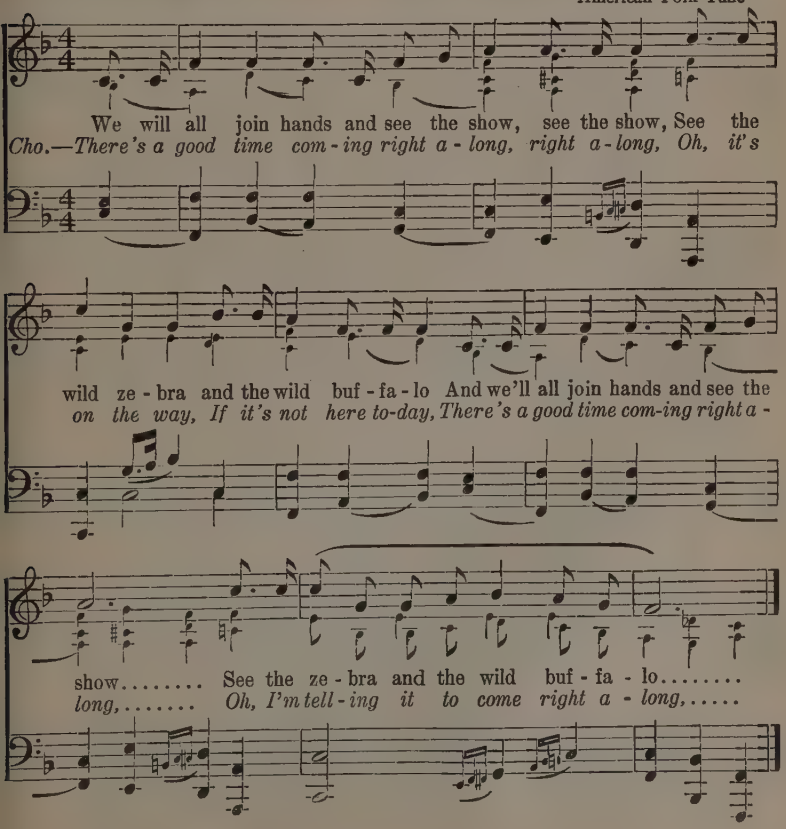
THE ANIMAL SHOW

Song leader introduces the various attractions of the circus, after this fashion, each followed by singing of the chorus.

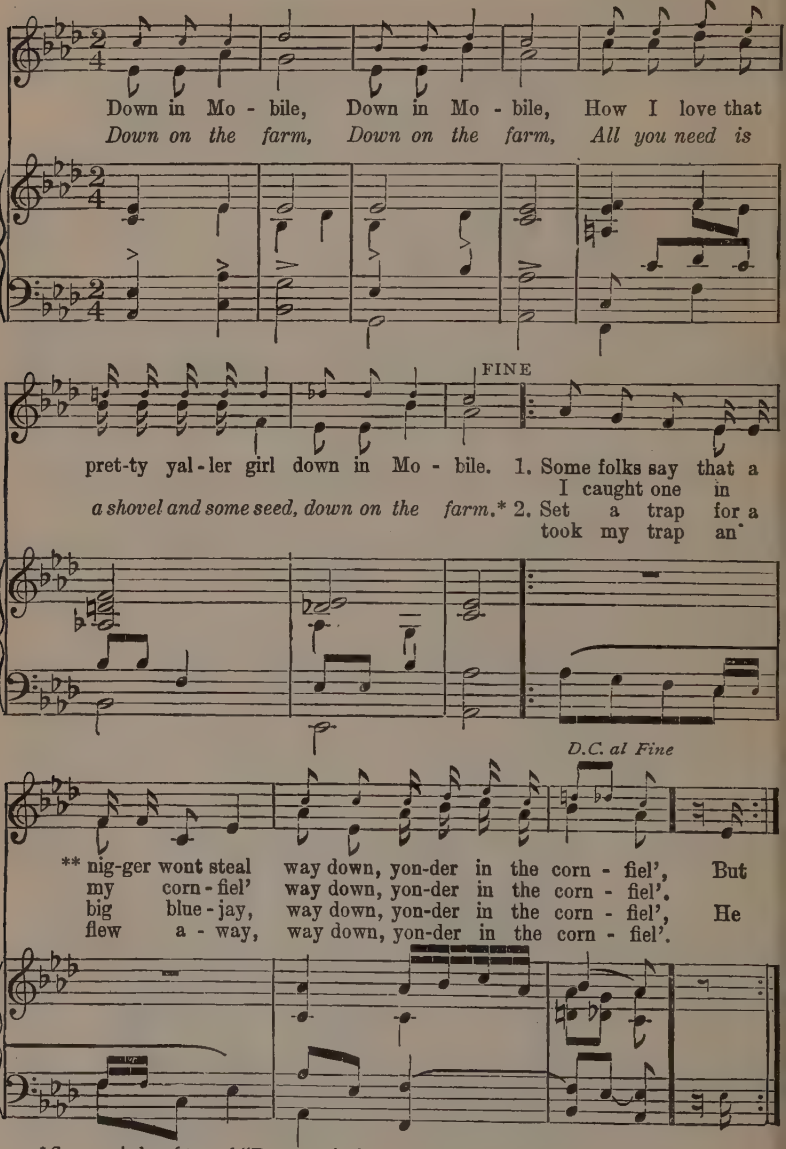
Song Leader:—"In this tent we have Mr. – – – – –
The greatest (camp leader) the world has ever known:
So large is his heart, and so genial his disposition,
That even when he has to reprove us for our faults,
It hurts him more than it does us!"
Voice from the Crowd; "How do we know this?"
Crowd: "Because he tells us so."
Leader: Animals growl!
Crowd: (Chorus of yowls)
Leader: Louder for the ladies!
Crowd: (More yowls; — — fiercer ones)

Chorus then sings:

American Folk Tune

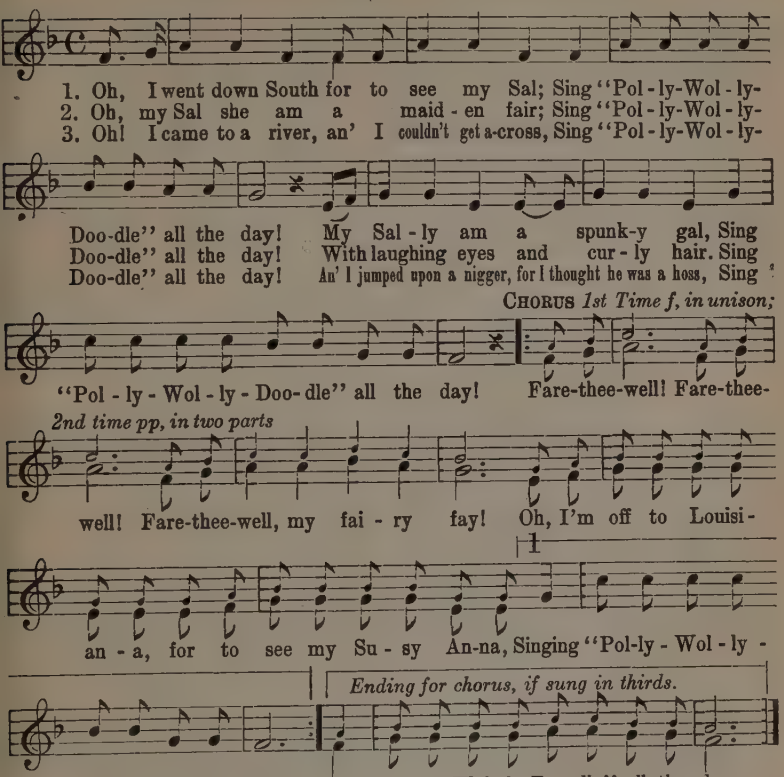

We will all join hands and see the show, see the show, See the
Cho.—There's a good time com-ing right a-long, right a-long, Oh, it's
wild ze-bra and the wild buf-fa-lo And we'll all join hands and see the
on the way, If it's not here to-day, There's a good time com-ing right a-
show..... See the ze-bra and the wild buf-fa-lo.....
long,..... Oh, I'm tell-ing it to come right a-long,.....

WAY DOWN YONDER IN THE CORNFIELD

American Folk Song

Down in Mo - bile, Down in Mo - bile, How I love that
Down on the farm, Down on the farm, All you need is
FINE
pret-ty yal-ler girl down in Mo - bile. 1. Some folks say that a
I caught one in
a shovel and some seed, down on the farm.* 2. Set a trap for a
took my trap an'
D.C. al Fine
** nig-ger wont steal way down, yon-der in the corn - fiel', But
my corn - fiel' way down, yon-der in the corn - fiel'.
big blue - jay, way down, yon-der in the corn - fiel', He
flew a - way, way down, yon-der in the corn - fiel'.

* See remainder of text of "Down on the Farm," on opposite page. ** *or*, crow.

POLLY WOLLY DOODLE

American Folk Tune

1. Oh, I went down South for to see my Sal; Sing "Pol-ly-Wol-ly-
2. Oh, my Sal she am a maid-en fair; Sing "Pol-ly-Wol-ly-
3. Oh! I came to a river, an' I couldn't get a-cross, Sing "Pol-ly-Wol-ly-
Doo-dle" all the day! My Sal-ly am a spunk-y gal, Sing
Doo-dle" all the day! With laughing eyes and cur-ly hair. Sing
Doo-dle" all the day! An' I jumped upon a nigger, for I thought he was a hoss, Sing
CHORUS 1st Time f, in unison;
"Pol-ly-Wol-ly-Doo-dle" all the day! Fare-thee-well! Fare-thee-
2nd time pp, in two parts
well! Fare-thee-well, my fai-ry fay! Oh, I'm off to Louisi-
an-a, for to see my Su-sy An-na, Singing "Pol-ly-Wol-ly-
Ending for chorus, if sung in thirds.
Doo-dle all the day. Sing "Pol-ly-Wol-ly-Doo-dle" all the day.

4 Oh! grasshopper sittin' on a railroad track; Sing "Polly," etc.
A-pickin' his teef wid a carpet tack Sing; "Polly," etc.

5 Behind de barn down, down on my knees; Sing "Polly," etc.
I thought I heard a chicken sneeze Sing; "Polly," etc.

6 He sneezed so hard wid de hoopin'-cough; Sing "Polly," etc.
He sneezed his head an' his tail right off; Sing "Polly," etc.

7 There was an old lady, and she had a bad dream; Sing "Polly," etc.
She dreamt that a donkey swallowed her sewing-machine; Sing "Polly," etc.

DOWN ON THE FARM

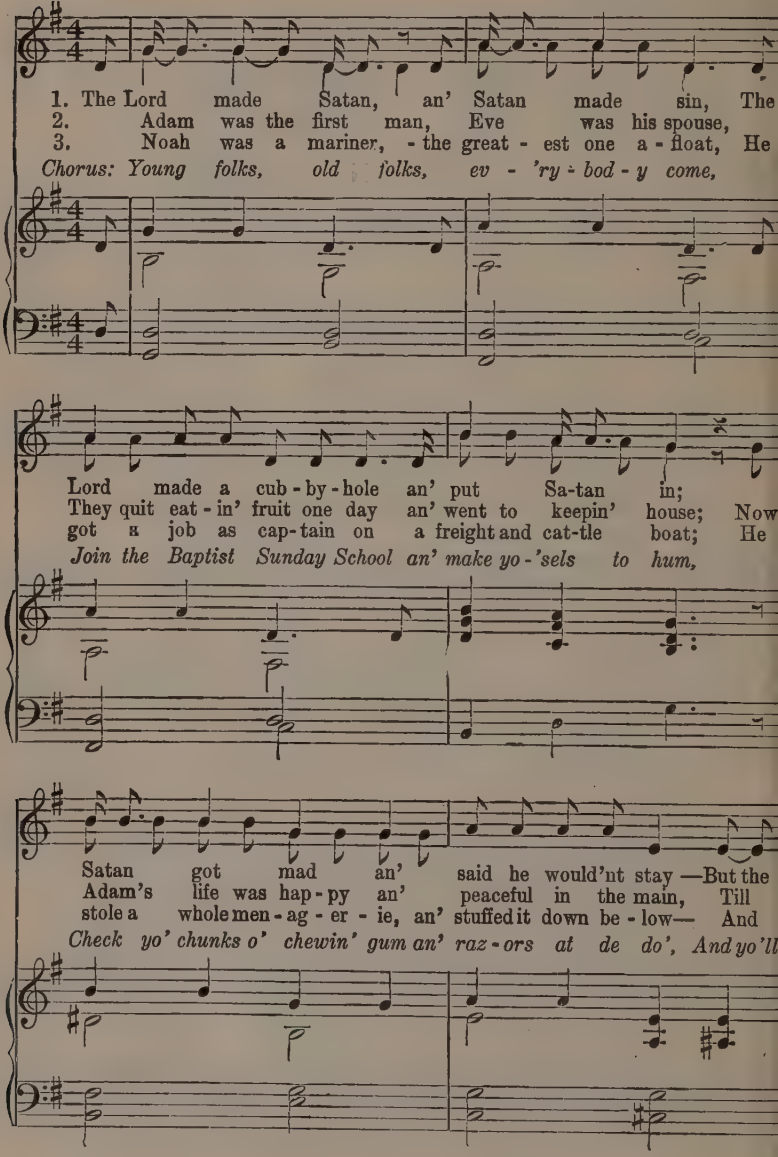
(Tune: "Down In Mobile")

How I long for a farmer's life. Get up early in the morning,
A far, far way from city strife, Get up early in the morning.

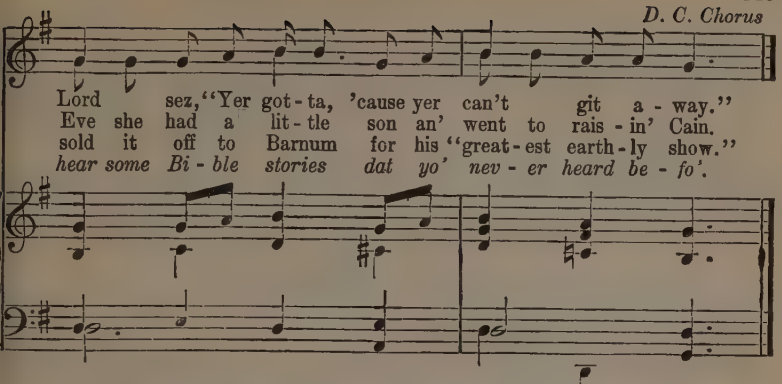
D. C. Down on the farm, down on the farm,
Work all day, a-gettin' in the hay, Down on the farm.

THE COLORED SUNDAY SCHOOL

American Folk Tune


1. The Lord made Satan, an' Satan made sin, The
2. Adam was the first man, Eve was his spouse,
3. Noah was a mariner, - the great - est one a - float, He
Chorus: Young folks, old folks, ev - 'ry - bod - y come,
Lord made a cub - by - hole an' put Sa-tan in;
They quit eat - in' fruit one day an' went to keepin' house; Now
got a job as cap-tain on a freight and cat-tle boat; He
Join the Baptist Sunday School an' make yo - 'sels to hum,
Satan got mad an' said he would'nt stay —But the
Adam's life was hap - py an' peaceful in the main, Till
stole a whole men - ag - er - ie, an' stuffed it down be - low— And
Check yo' chunks o' chewin' gum an' raz - ors at de do', And yo'll

D. C. Chorus


Lord sez, "Yer got-ta, 'cause yer can't git a-way."
Eve she had a lit-tle son an' went to rais-in' Cain.
sold it off to Barnum for his "great-est earth-ly show."
hear some Bi-ble stories dat yo' nev-er heard be-fo'.

4 Esau was a farmer lad of wild and wooly make,
His father sold him half a farm, and half to brother Jake;
When Esau saw the title to his farm it wasn't clear,
He sold it to his brother for a sandwich and a beer.–CHO.

5 Daniel was a fellow with a cast-iron hide,
Lions tried to eat him but they couldn't get inside;
When Darius came round and looked into the ring,
"I fooled you once" said Daniel, and the drinks were on the king.–CHO.

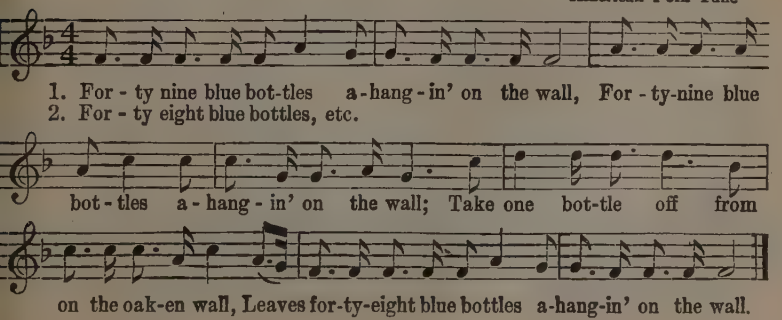
6 David was a farmer lad, a plucky little cuss,
Along came Goliah a' lookin' for a fuss;
When David saw that he had to fight or bust,
He threw a rock at Golly, and it busted in his crust.–CHO.

7 Jonah was a mariner—so runs the Bible tale;
He bought a passage ticket on a trans-Atlantic whale:
When Jonah in the belly of the whale felt oppress'd
Why Jonah pushed the button and the whale did the rest.–CHO.

8 Stories of the wooly West you've heard both loud and long
Where cowboys with their lariats roped cows so fierce and strong
But now we've come to other days with simple tasks so full
We tip our hats to – – – – for he sure can "throw the bull."–CHO.

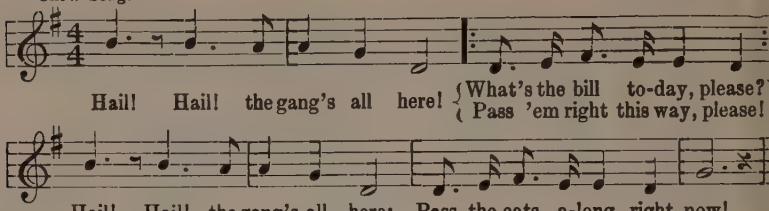
FORTY-NINE BOTTLES

American Folk Tune


1. For-ty nine blue bot-tles a-hang-in' on the wall, For-ty-nine blue
2. For-ty eight blue bottles, etc.
bot-tles a-hang-in' on the wall; Take one bot-tle off from
on the oak-en wall, Leaves for-ty-eight blue bottles a-hang-in' on the wall.

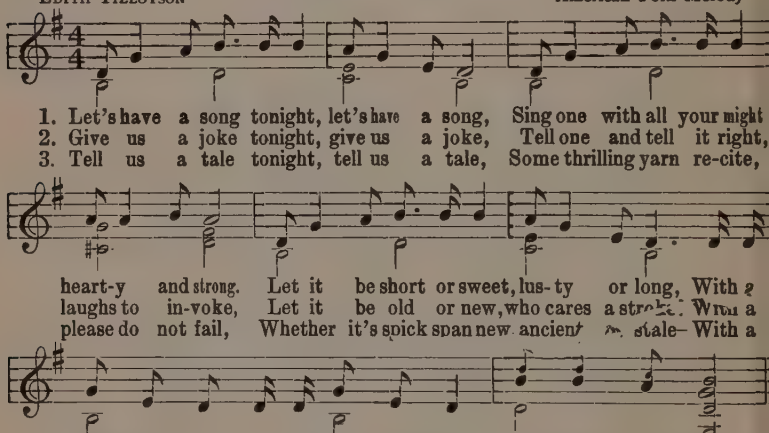
THE GANG'S ALL HERE

Chow Song: College Tune

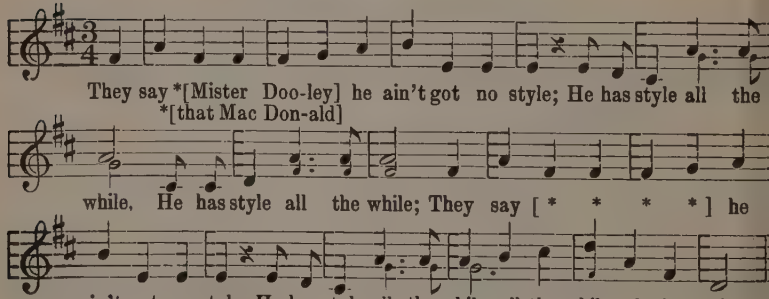

Hail! Hail! the gang's all here! What's the bill to-day, please?
Pass 'em right this way, please!
Hail! Hail! the gang's all here; Pass the eats a-long right now!

TO START SOMETHING

EDITH TILLOTSON American Folk Melody


1. Let's have a song tonight, let's have a song, Sing one with all your might
2. Give us a joke tonight, give us a joke, Tell one and tell it right,
3. Tell us a tale tonight, tell us a tale, Some thrilling yarn re-cite,
heart-y and strong. Let it be short or sweet, lus-ty or long, With
laughs to in-voke, Let it be old or new, who cares a straw, With a
please do not fail, Whether it's spick span new ancient or stale— With a
high-brow tune or a rag-time croon—Let's have a song!
lot of wit, or a lit-tle bit— Give us a joke!
mor-al small or with none at all— Tell us a tale!

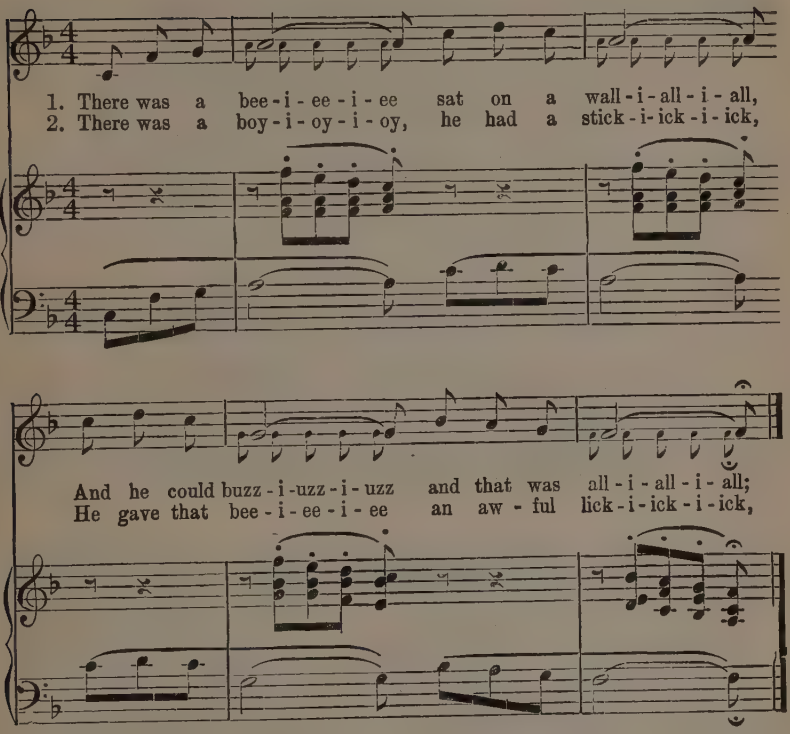
STYLE ALL THE WHILE


They say *[Mister Doo-ley] he ain't got no style; He has style all the
*[that Mac Don-ald]
while, He has style all the while; They say [* * * *] he
ain't got no style, He has style all the while, all the while, all the while.

* Insert name as desired.

THERE WAS A BEE-I-EE

American Folk Tune


1. There was a bee-i-ee-i-ee sat on a wall-i-all-i-all,
2. There was a boy-i-oy-i-oy, he had a stick-i-ick-i-ick,
And he could buzz-i-uzz-i-uzz and that was all-i-all-i-all;
He gave that bee-i-ee-i-ee an aw-ful lick-i-ick-i-ick,

3 And then that bee-i-ee-i-ee
began to sting-i-ing-i-ing;
He stung that boy-i-oy-i-oy
like everything-i-ing-i-ing.

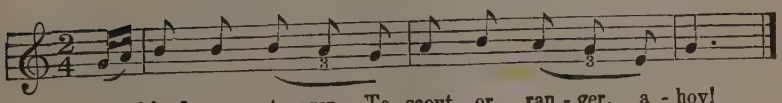
4 And then that boy-i-oy-i-oy
began to yell-i-ell-i-ell;
He told that bee-i-ee-i-ee
to go – – – – away.

WORK AND PLAY

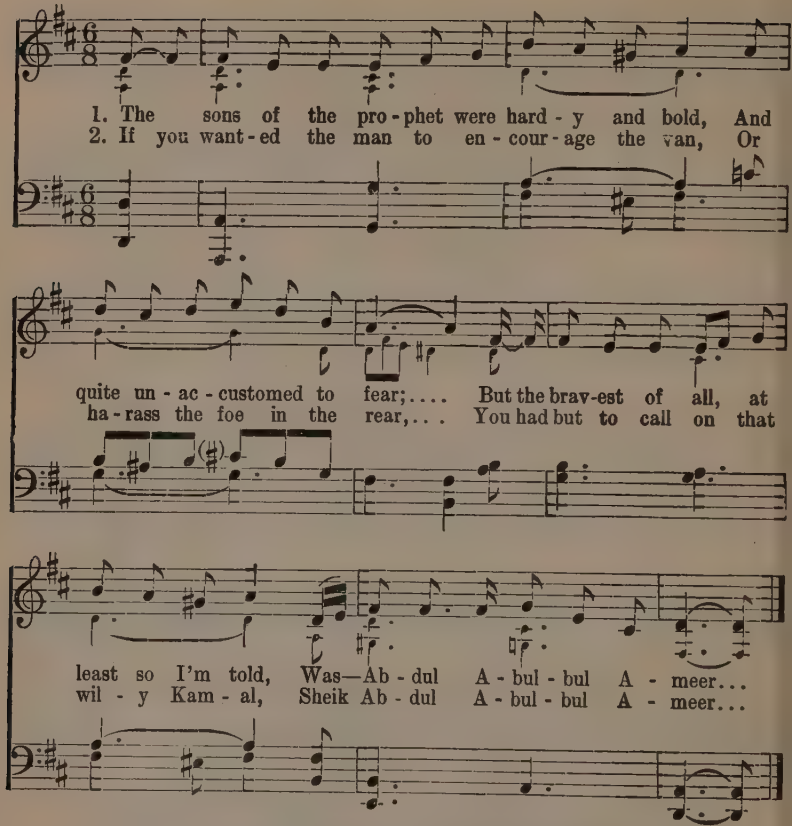
1 When I was young
I used to say;
"One hour for work
And two for play".

2 As I grow old,
How strange to find
I never seem
To change my mind.

THE WOOD-CRAFTERS' WHISTLE



ABDUL ABULBUL AMEER


1. The sons of the pro-phet were hard-y and bold, And
2. If you want-ed the man to en-cour-age the van, Or
quite un-ac-customed to fear;.... But the brav-est of all, at
ha-rass the foe in the rear,... You had but to call on that
least so I'm told, Was—Ab-dul A-bul-bul A-meer...
wil-y Kam-al, Sheik Ab-dul A-bul-bul A-meer...

There were brave men a-plenty, and well-known to fame,
In the armies that followed the Czar,
But the bravest of all, and the one the least tame,
Was Ivan Petrofsky Scavar.

He could sing like Caruso, in tenor or bass,
Or play on the Spanish guitar;
In fact, quite the cream of that Muscovite team
Was Ivan Petrofsky Scavar.

One morning this Russian had shouldered his gun,
And assumed his most truculent leer.
At the rise of the sun, he just managed to run
Into Abdul Abulbul Ameer.

"Young man," quoth Bulbul, "has your life been so dull,
That you now wish to end your career?
For, infidel, know you have trod on the toe
Of Abdul Abulbul Ameer.

"So take your last look on each sky, sea, and brook,
And send your regrets to the Czar.
For by this I imply, thou art going to die,
Count Ivan Petrofsky Scavar!"

Said Ivan, "My friend, your remarks, in the end,
Will avail you but little, I fear,
For you will never survive to repeat them alive,
Senor Abdul Abulbul Ameer."

Then that brave Marmeluke drew his trusty Skabook,
And shouting "Allah!" and "Allah!"
With murder intent, he immediately went
After Ivan Petrofsky Scavar.

Right soon was his knife extracting his life—
In fact, he had shouted "Hurrah!"
When he felt himself stuck by that wily Calmuck,
Count Ivan Petrofsky Scavar.

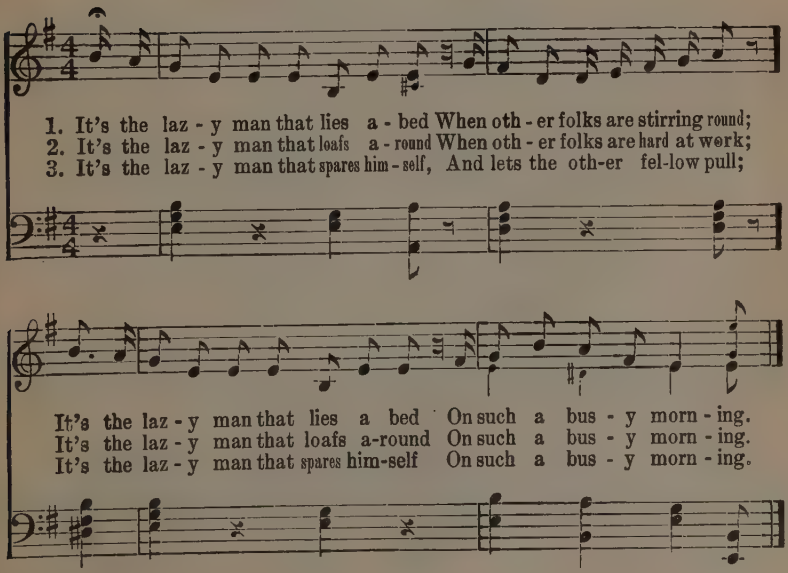
The Sultan rode up the disturbance to quell,
Or award to the victor a cheer.
He arrived just in time to bid hasty farewell
To Abdul Abulbul Ameer.

And the Grand Duke, too, in his spectacles blue,
Rode up in the Emperor's car.
His Highness drew nigh just to catch the last sigh
Of Ivan Petrofsky Scavar.

And there is a stone where the Danube doth roll,
And on it in characters clear,
"O Stranger, desist, and pray for the soul
Of Abdul Abulbul Ameer."

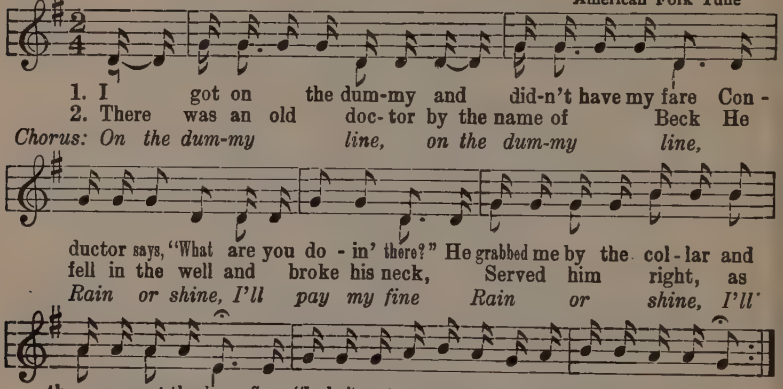
And the Muscovite maidens their sad vigils keep
By the light of the cold Northern star,
And the name that they murmur most oft in their sleep
Is Ivan Petrofsky Scavar.

THE LAZY MAN


1. It's the laz - y man that lies a - bed When oth - er folks are stirring round;
2. It's the laz - y man that loafs a - round When oth - er folks are hard at work;
3. It's the laz - y man that spares him - self, And lets the oth-er fel-low pull;
It's the laz - y man that lies a bed On such a bus - y morn - ing.
It's the laz - y man that loafs a-round On such a bus - y morn - ing.
It's the laz - y man that spares him-self On such a bus - y morn - ing.

THE DUMMY LINE

American Folk Tune


1. I got on the dum-my and did-n't have my fare Con -
2. There was an old doc-tor by the name of Beck He
Chorus: On the dum-my line, on the dum-my line,
ductor says, "What are you do - in' there?" He grabbed me by the col - lar and
fell in the well and broke his neck, Served him right, as
Rain or shine, I'll pay my fine Rain or shine, I'll'
threw me out the door, Says "I don't want to see you on the dummy an - y more."
you will own; He oughta tended to the sick and let the well a-lone.
pay my fine Rid-in', rid-in', rid-in' on the dummy dummy line.

Farmer Jones went out in a boat,
The boat tipped over and they throwed him a rope;
Farmer Jones says, "Well, I can't swim,
But I'll be gosh-darned if I'll be roped in."

I've got a girl down in Mobile,
She's got a face like a lemon peel,
She's got a wart on the end of her chin,
She calls it a dimple—but a dimple turns in.

A little boy coming home from school,
Saw a half dollar at the foot of a mule;
He stooped down just as sly as a mouse—
Funeral next day in the little boy's house.

Bought a combination suit of underwear
To keep out the damp and frizzly air;
Wore it six weeks without irritation—
And couldn't get it off for I'd lost the combination.

The engine stopped at a little town
In came three maidens all dressed in brown;
There aren't any seats, said one with a frown,
Mr. ——— got up and they all sat down.

I said to the brakeman, "Can't you speed up a bit;"
Says he, "You can walk if you don't like it:"
Says I, "Old man, I'd take your dare—
But the folks don't expect me till the train gets there."

The *Conductor swallowed a nickel one day
And he was much put out they say;
Listen and I'll tell you what 'twas all about,
He was a nickel in—but he was a nickel out.

I saw a snail go whizzin' past:
"Gee!" says I, "this train is fast;"
"Yes," says a guy, "what you say is true—
But I'd like to know—what is it fast to?"

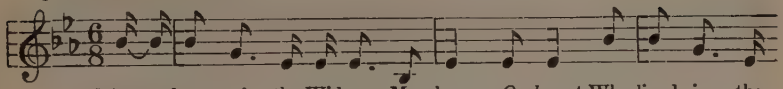
A queer looking dame across the aisle
Grabbed up her grips and looked at me with a smile,
"I must be off," says she to me.
Says I, "You're off, that's plain to see."

The engine stopped with a wheeze and a cough;
The porter says, "Shall I brush you off?"
"No," says I, "You colored jay,
I prefer to get off in the usual way."

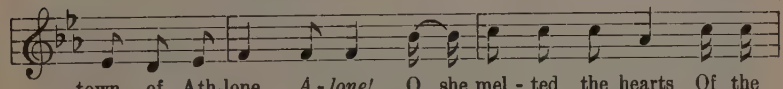
*or, bookkeeper, etc.

THE WIDOW MALONE

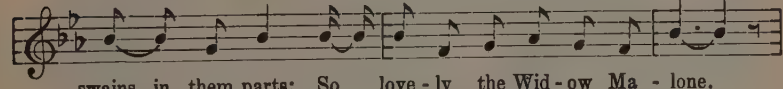
CHARLES LEVER



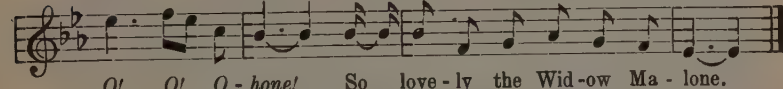
1. Did you hear of the Widow Ma - lone, *O - hone!* Who lived in the
2. Of lov - ers she had a full score, *Or more,* And fortunes they
3. But so mod - est was Mistress Ma-lone, *'Twas known* That no one could
4. Till one Mis - ther O'Bri - en, from Clare, *How quare!* It's lit - tle for
5. And the wid - ow they all thought so shy, *My eye!* Ne'er thought of a
6. There's a mor - al contained in my song, *Not wrong;* One com - fort, it's



town of Ath-lone, *A - lone!* O, she mel - ted the hearts Of the
all had gal - ore, *In store;* From the min - is - ter down To the
see her a - lone, *O - hone!* Let them og - le and sigh, They could
blush - ing they care, *Down there,* Put his arm round her waist, Gave ten
sim - per or sigh, *For why?* But, "Luci - us," says she, "Since you've
not ver - y long, *But strong!* If for wid - ows you die, Learn to

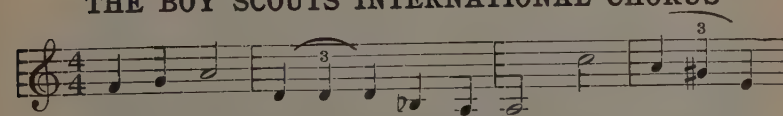


swains in them parts: So love - ly the Wid - ow Ma - lone.
clerk of the Crown All were courting the Wid - ow Ma - lone,
ne'er catch her eye, So bash - ful the Wid - ow Ma - lone,
kiss - es at laste, "O," says he, "you're my Mol - ly Ma - lone,
now made so free, You may mar-ry your Ma - ry Ma - lone.
kiss, not sigh; For they're all like sweet Mis-tress Ma - lone,

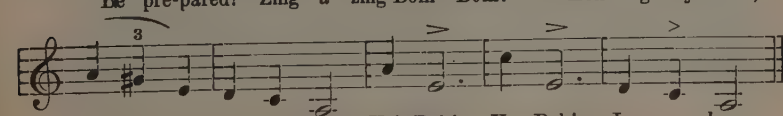


O! O! O - hone! So love - ly the Wid - ow Ma - lone.
O! O! O - hone! All were courting the Wid - ow Ma - lone.
O! O! O - hone! So bash - ful the Wid - ow Ma - lone.
O! O! My own! "O," says he, "you're my Mol - ly Ma - lone.
O! O! O - hone! You may mar - ry your Ma - ry Ma - lone.
O! O! O - hone! O, they're all like sweet Mistress Ma - lone.

THE BOY SCOUTS INTERNATIONAL CHORUS



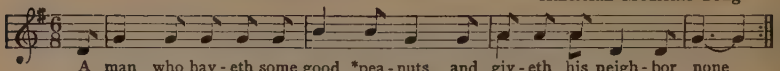
Be pre-pared! Zing - a - zing Bom - Bom! Eon - gon - yâm - a,



Gon-yâm - a, In - voo - boo. Yah-Boh! Ya - Boh! In - voo - boo.

A MAN WHO HAVETH

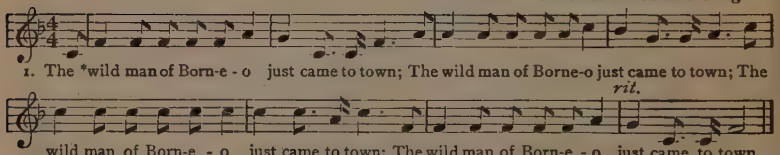
American Medicine Song



[Substitute for other verses: *spondulacs *ripe, red strawberry short-cake]

WILD MAN OF BORNEO

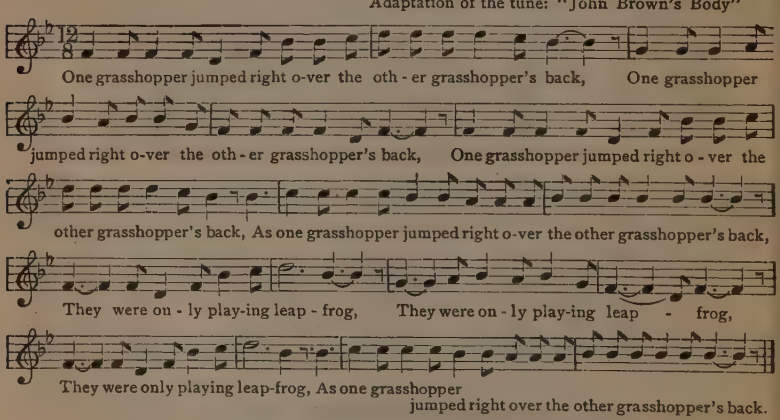
American Medicine Song


1. The *wild man of Born-e - o just came to town; The wild man of Borne-o just came to town; The
rit.
wild man of Born-e - o just came to town; The wild man of Born-e - o just came to town.

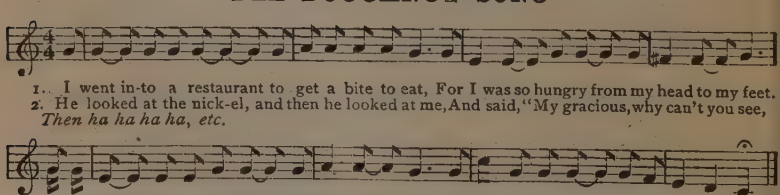
*For other verses insert: 2. wife of the 3. daughter of the wife of the 4. dog of the daughter of the wife of the 5. the tail of the dog of the daughter of the wife of the 6. hair on the tail of the dog of the, etc. 7. flea in the hair on the tail of the dog of the, etc. 8. whiskers on the flea in the hair of the tail of the dog of the, etc.

GRASSHOPPER SONG

Adaptation of the tune: "John Brown's Body"


One grasshopper jumped right o-ver the oth - er grasshopper's back, One grasshopper
jumped right o-ver the oth - er grasshopper's back, One grasshopper jumped right o - ver the
other grasshopper's back, As one grasshopper jumped right o-ver the other grasshopper's back,
They were on - ly play-ing leap - frog, They were on - ly play-ing leap - frog,
They were only playing leap-frog, As one grasshopper
jumped right over the other grasshopper's back.

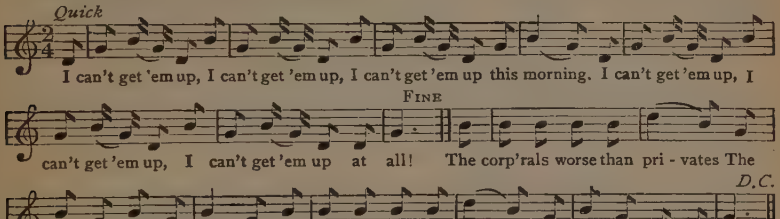
THE DOUGHNUT SONG


1. I went in-to a restaurant to get a bite to eat, For I was so hungry from my head to my feet.
2. He looked at the nick-el, and then he looked at me, And said, "My gracious, why can't you see,
Then ha ha ha ha, etc.
I ordered up a doughnut, and scraped off the grease, And handed the waiter a five-cent piece.
There's a hole in that nickel and it goes straight thro'?" Ses I, "There's a hole in the doughnut, too."

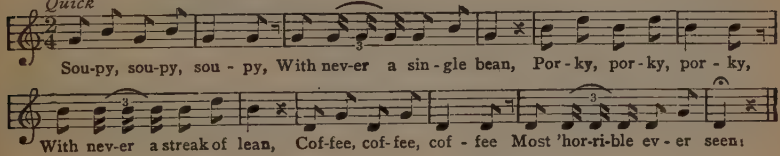
THE BUGLER

Additional notes inserted are not from the Manual of Arms. Words are provided so the calls can be sung if desired, and for this reason most of them are transposed to a lower key. The Army and Navy attach different numbers to the same call, so the both numbers are given in brackets at the right: A—army; N—navy.

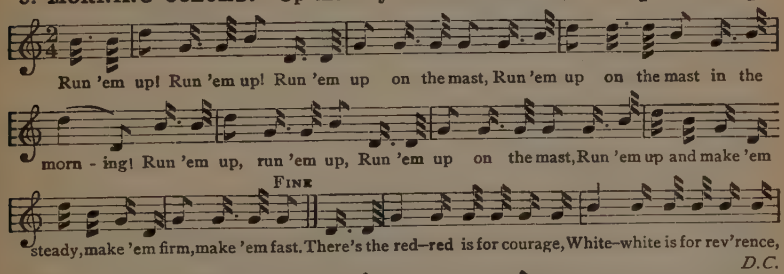
1. REVEILLE. "Wake up; get up." [A 15–N 1]


Quick
I can't get 'em up, I can't get 'em up, I can't get 'em up this morning. I can't get 'em up, I
FINE
can't get 'em up, I can't get 'em up at all! The corp'rals worse than pri - vates The
D.C.
sergeant's worse than corp'rals Lieutenant's worse than sergeants The captain's worst of all.

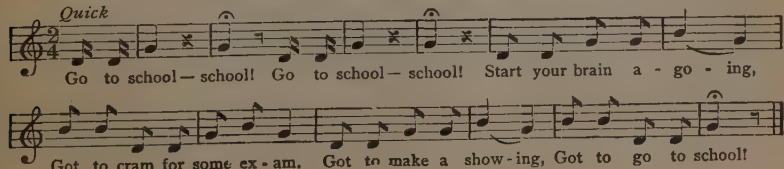
2. MESS. "Call to meals" [A 20–N 17]


Quick
Sou-py, sou-py, sou - py, With nev-er a sin - gle bean, Por - ky, por - ky, por - ky,
With nev-er a streak of lean, Cof-fee, cof-fee, cof - fee Most 'hor-ri-ble ev - er seen!

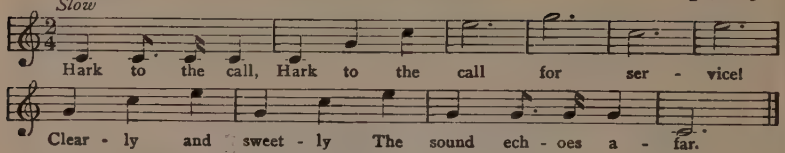
3. MORNING COLORS. Up the halyard at the first note [A 11–N 5]


Run 'em up! Run 'em up! Run 'em up on the mast, Run 'em up on the mast in the
morn - ing! Run 'em up, run 'em up, Run 'em up on the mast, Run 'em up and make 'em
FINE
steady, make 'em firm, make 'em fast. There's the red—red is for courage, White—white is for rev'rence,
D.C.
Blue—blue is for hon - or, Each and all of 'em, each and all of 'em Stand for the U. S. A.

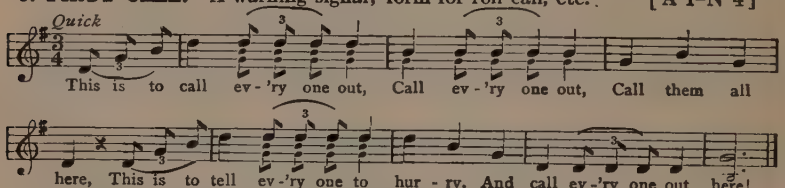
4. SCHOOL. To call classes for study or recitation [A 29–N 39]


Quick
Go to school— school! Go to school— school! Start your brain a - go - ing,
Got to cram for some ex - am. Got to make a show - ing, Got to go to school!

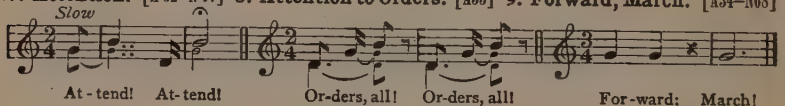
5. CHURCH. Divine service about to be held [N 34]



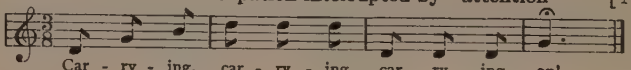
6. FIRST CALL. A warning signal; form for roll-call, etc. [A 1–N 4]


Quick
This is to call ev - 'ry one out, Call ev - 'ry one out, Call them all
here, This is to tell ev - 'ry one to hur - ry, And call ev - 'ry one out here!

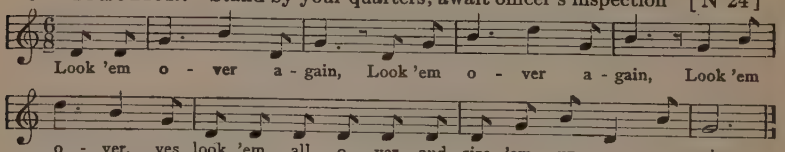
7. Attention. [A 32–N 67] **8. Attention to Orders.** [A33] **9. Forward; March.** [A34–N68]



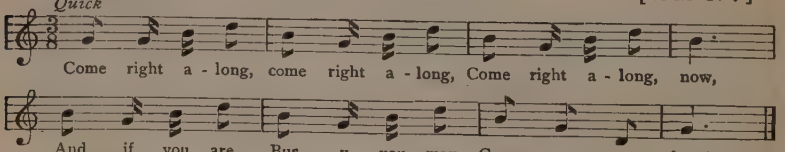
10. CARRY ON. Resume occupation interrupted by "attention" [N 19]



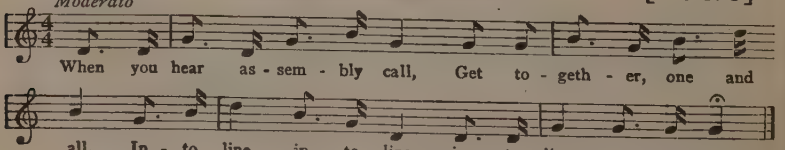
11. INSPECTION. Stand by your quarters; await officer's inspection [N 24]



12. OFFICER'S CALL. To assemble the officers [A 25–N 7]

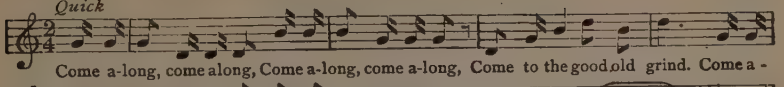


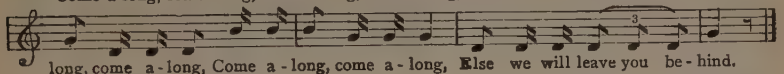
13. ASSEMBLY. Divisions to assemble for muster [A 9–N 8]



14. DRILL. Proceed with the exercises of the day [A 5–N 9]

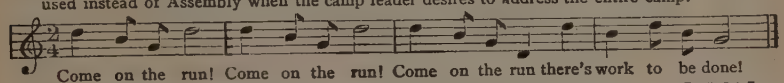
Quick



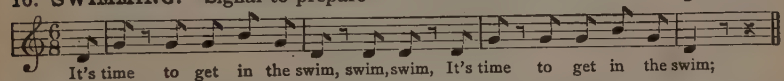


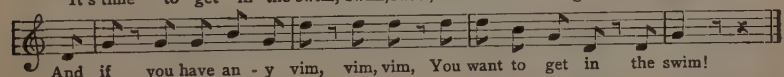
15. ADJUTANT'S CALL. [A 10–N 66]

Signal for companies to form battalion. Also for guard details to form for guard mount. May be used instead of Assembly when the camp leader desires to address the entire camp.

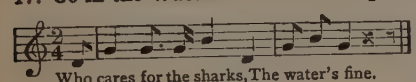


16. SWIMMING. Signal to prepare [N 32]

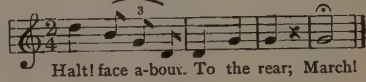




17. Go in the Water. "Overboard" [N 33]



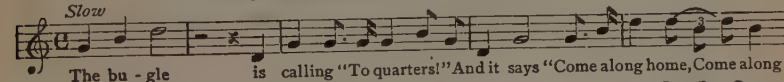
18. To the Rear. [A 37–N 95]

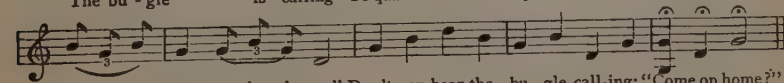


19. CALL TO QUARTERS. [A 18–N 63]

Usually sounded after "Tattoo" and before "Taps"

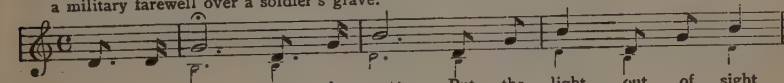
Slow

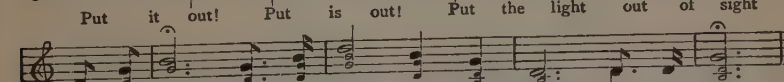




20. TAPS. [A 19–N 3]

The phrase "put it out," meaning "lights out," survives from civil war days. Taps also signifies a military farewell over a soldier's grave.

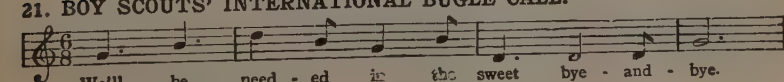




1 Day is done, gone the sun, From the lake, from the hills, from the sky;
All is well, safely rest, God is nigh.

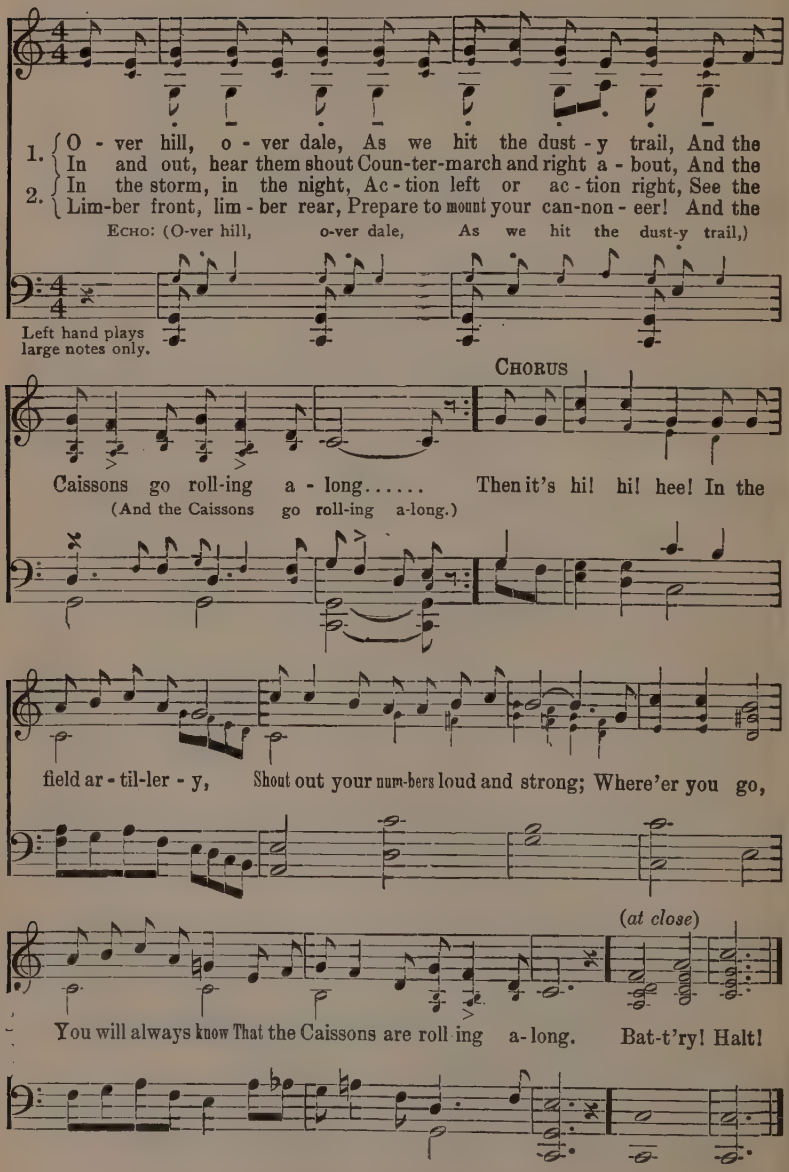
2 Fading light, dims the sight, And a star gems the sky, gleaming bright;
From afar drawing nigh, falls the night.

21. BOY SCOUTS' INTERNATIONAL BUGLE CALL.



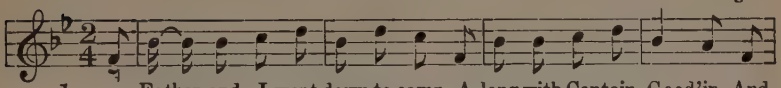
ARTILLERY SONG

U. S. Army Song

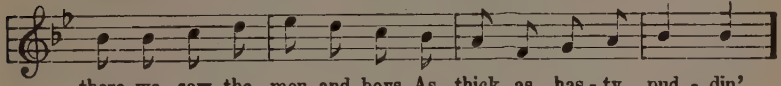

1. O - ver hill, o - ver dale, As we hit the dust - y trail, And the
In and out, hear them shout Coun-ter-march and right a - bout, And the
2. In the storm, in the night, Ac - tion left or ac - tion right, See the
Lim-ber front, lim - ber rear, Prepare to mount your can-non - eer! And the
Echo: (O-ver hill, o-ver dale, As we hit the dust-y trail,)
Left hand plays large notes only.
Chorus
Caissons go roll-ing a - long..... Then it's hi! hi! hee! In the
(And the Caissons go roll-ing a-long.)
field ar - til-ler - y, Shout out your num-bers loud and strong; Where'er you go,
(at close)
You will always know That the Caissons are roll ing a-long. Bat-t'ry! Halt!

YANKEE DOODLE

American Folk Song

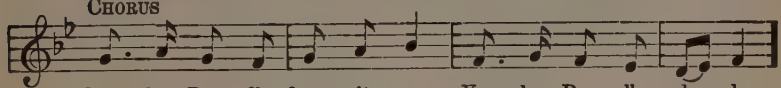


1. Father and I went down to camp, A-long with Captain Good'in, And
2. And there we see a thousand men, As rich as Squire Da - vid; And
3. And there was Captain Washington, Up - on a slapping stal - lion, A -
4. And then the feathers in his hat, They look'd so ver - y fine, ah! I

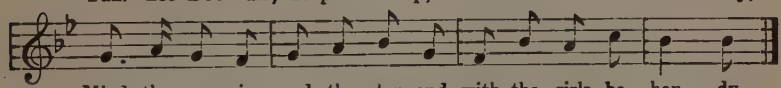


there we saw the men and boys As thick as has - ty pud - din'.
what they wast-ed ev -'ry day, I wish it could be sav - ed.
giv - ing or - ders to his men; I guess there was a mil - lion.
wan - ted pesk - i - ly to get To give to my Je - mi - ma.

CHORUS



Yan. - kee Doo - dle, keep it up, Yan - kee Doo - dle dan - dy;



Mind the mu - sic and the step and with the girls be han - dy.

5 And there I see a swamping gun,
Large as a log of maple,
Upon a mighty little cart;
A load for father's cattle.—CHO.

6 And every time they fired it off,
It took a horn of powder;
It made a noise like father's gun,
Only a nation louder.—CHO.

7 And there I see a little keg,
Its head all made of leather,
They knocked upon't with little sticks,
To call the men together.—CHO.

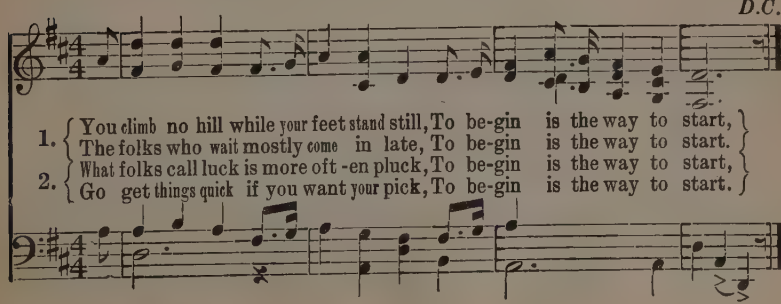
8 And Cap'n Davis had a gun,
He kind o' clapt his hand on't,
And stuck a crooked stabbing iron
Upon the little end on't.—CHO.

9 The troopers, too, would gallop up
And fire right in our faces;
It scared me almost half to death
To see them run such races.—CHO.

10 It scared me so I hooked it off,
Nor stopped, as I remember,
Nor turned about till I got home
Locked up in mother's chamber.—CHO.

THE WAY TO START

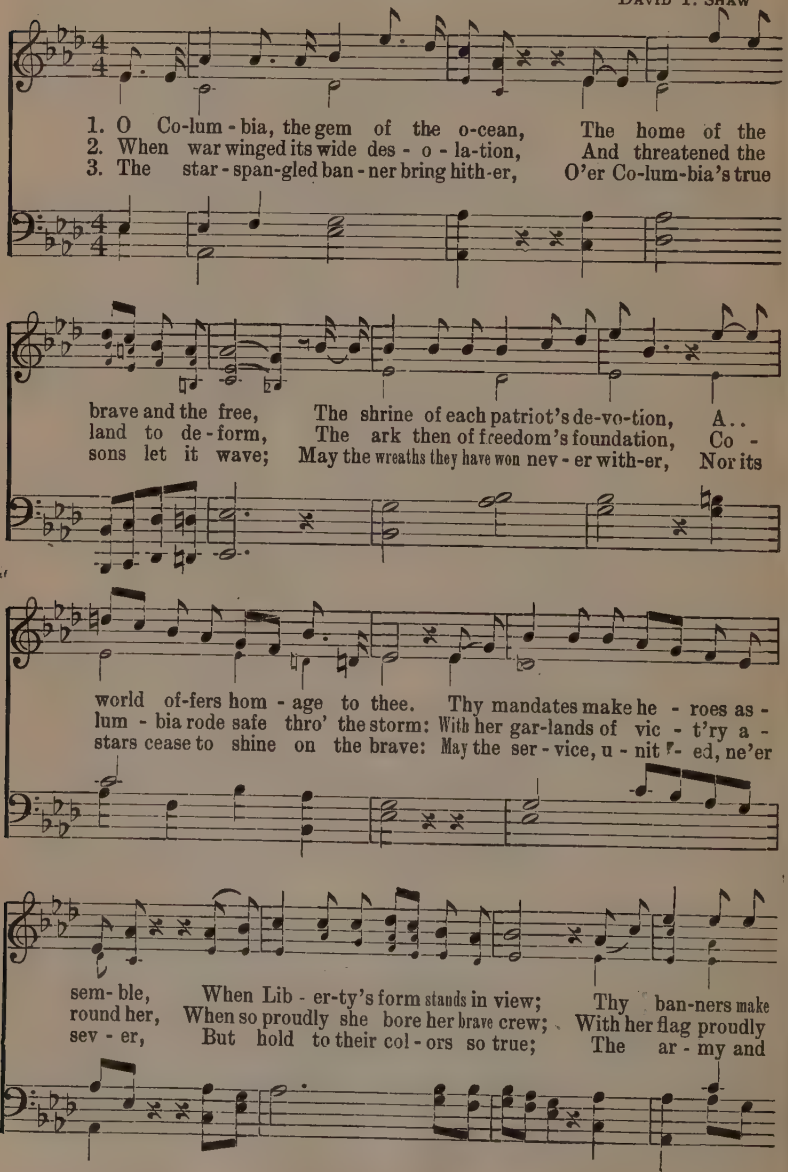
D.C.



1. You climb no hill while your feet stand still, To be-gin is the way to start,
   The folks who wait mostly come in late, To be-gin is the way to start.
2. What folks call luck is more oft-en pluck, To be-gin is the way to start,
   Go get things quick if you want your pick, To be-gin is the way to start.

COLUMBIA, THE GEM OF THE OCEAN

DAVID T. SHAW


1. O Co-lum-bia, the gem of the o-cean, The home of the
2. When war winged its wide des-o-la-tion, And threatened the
3. The star-span-gled ban-ner bring hith-er, O'er Co-lum-bia's true
brave and the free, The shrine of each patriot's de-vo-tion, A..
land to de-form, The ark then of freedom's foundation, Co-
sons let it wave; May the wreaths they have won nev-er with-er, Nor its
world of-fers hom-age to thee. Thy mandates make he-roes as-
lum-bia rode safe thro' the storm: With her gar-lands of vic-t'ry a-
stars cease to shine on the brave: May the ser-vice, u-nit-ed, ne'er
sem-ble, When Lib-er-ty's form stands in view; Thy ban-ners make
round her, When so proudly she bore her brave crew; With her flag proudly
sev-er, But hold to their col-ors so true; The ar-my and

tyr - an - ny tremble, When borne by the red, white, and blue!
float - ing be-fore her, The boast of the red, white, and blue!
na - vy for - ev - er, Three cheers for the red, white, and blue!

CHORUS

When borne by the red, white, and blue! When borne by the red, white, and blue! Thy
The boast of the red, white, and blue! The boast of the red, white, and blue! With her
Three cheers for the red, white, and blue! Three cheers for the red, white, and blue! The

ban-ners make tyr- an - ny tremble, When borne by the red, white, and blue!
flag proudly floating be-fore her, The boast of the red, white, and blue!
ar - my and na - vy for- ev - er, Three cheers for the red, white, and blue!

TO-DAY IS MONDAY

Army Song

1. To-day is Monday, To-day is Monday, Mon-day bread and butter,
2. To-day is Tuesday, To-day is Tuesday, Tuesday string beans,*
3. To-day is Wednesday, To-day is Wednesday, Wednesday sou - *ou*p,

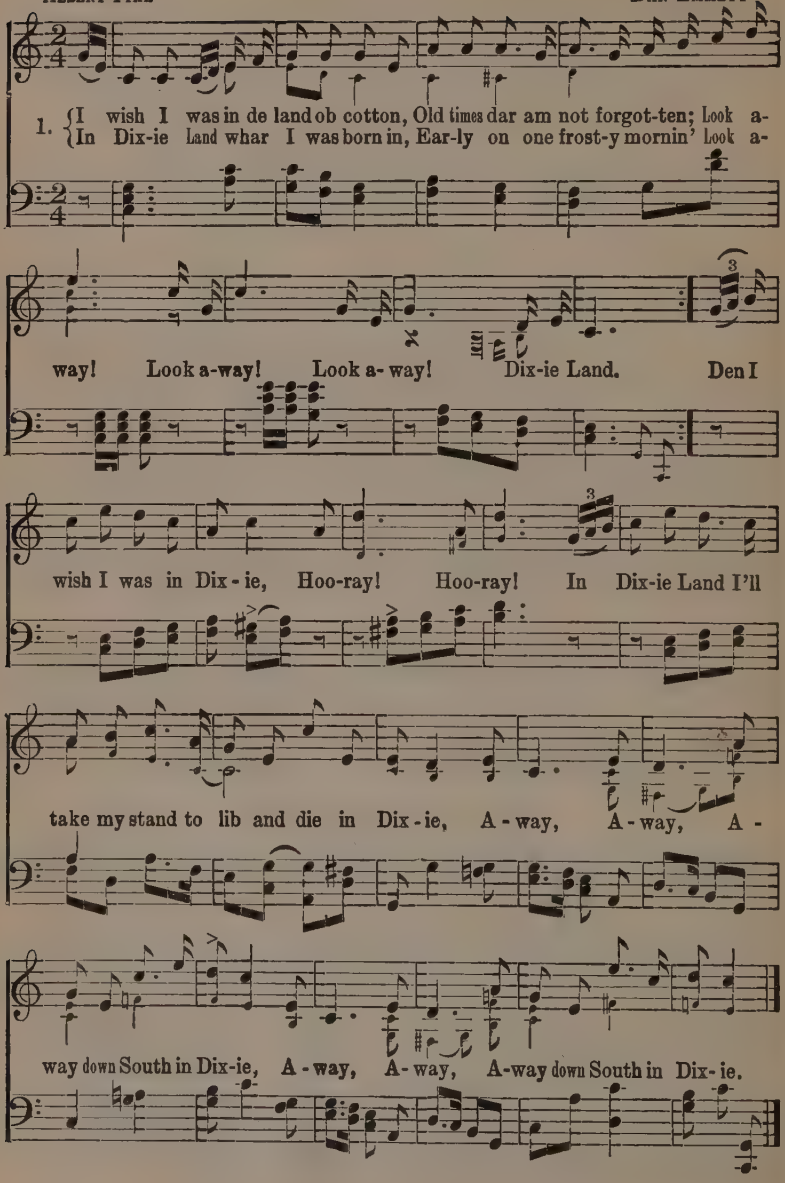
all you hun - gry sol - diers we wish the same to you.

4, Thursday, roastbeef; 5. Friday, fish; 6. Saturday, pay-day; 7. Sunday, church.

* In each verse, after the first, repeat in reverse order all of this measure from all of the previous verses. Thus the last verse will be: Sunday, church; Saturday, pay-day; Friday, fish; Thursday, roastbeef; Wednesday, sou-oup; Tuesday, string-beans: Monday, bread and butter, etc. Begin the last verse very slowly, growing continuously faster to the end.

DIXIE

ALBERT PIKE — DAN EMMETT


1. I wish I was in de land ob cotton, Old times dar am not forgot-ten; Look a-
In Dix-ie Land whar I was born in, Ear-ly on one frost-y mornin' Look a-
way! Look a-way! Look a-way! Dix-ie Land. Den I
wish I was in Dix-ie, Hoo-ray! Hoo-ray! In Dix-ie Land I'll
take my stand to lib and die in Dix-ie, A-way, A-way, A-
way down South in Dix-ie, A-way, A-way, A-way down South in Dix-ie.

Old Missus marry "Will-de-Weaber"
Willium, was a gay deceaber; Look away, etc.
But when he put his arm around 'er,
He smiled as fierce as a forty pounder, Look away, etc.

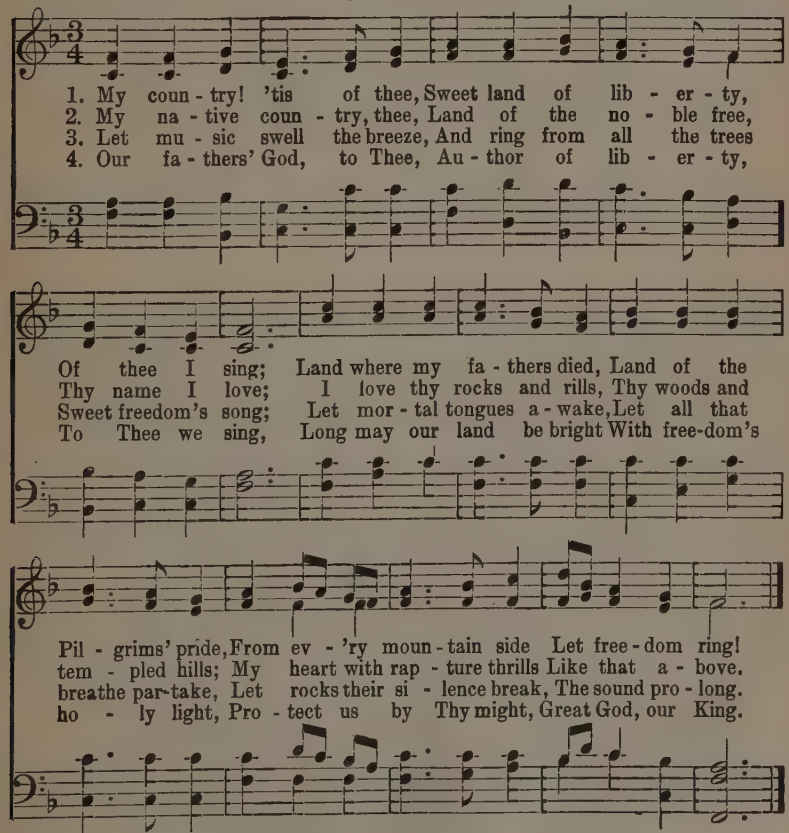
His face was sharp as a butcher's cleaber,
But dat did not seem to greab 'er; Look away, etc.
Old Missus acted the foolish part,
An' died for a man dat broke her heart, Look away, etc.

Now here's a health to de next old Missus,
And all de gals dat want to kiss us; Look away, etc.
But if you want to drive 'way sorrow
Come and hear dis song to-morrow, Look away, etc.

Dar's buckwheat cakes an' Ingen batter,
Makes you fat or a little fatter; Look away, etc.
Den hoe it down and scratch your grabble,
To Dixie's land I'm bound to trabble, Look away, etc.

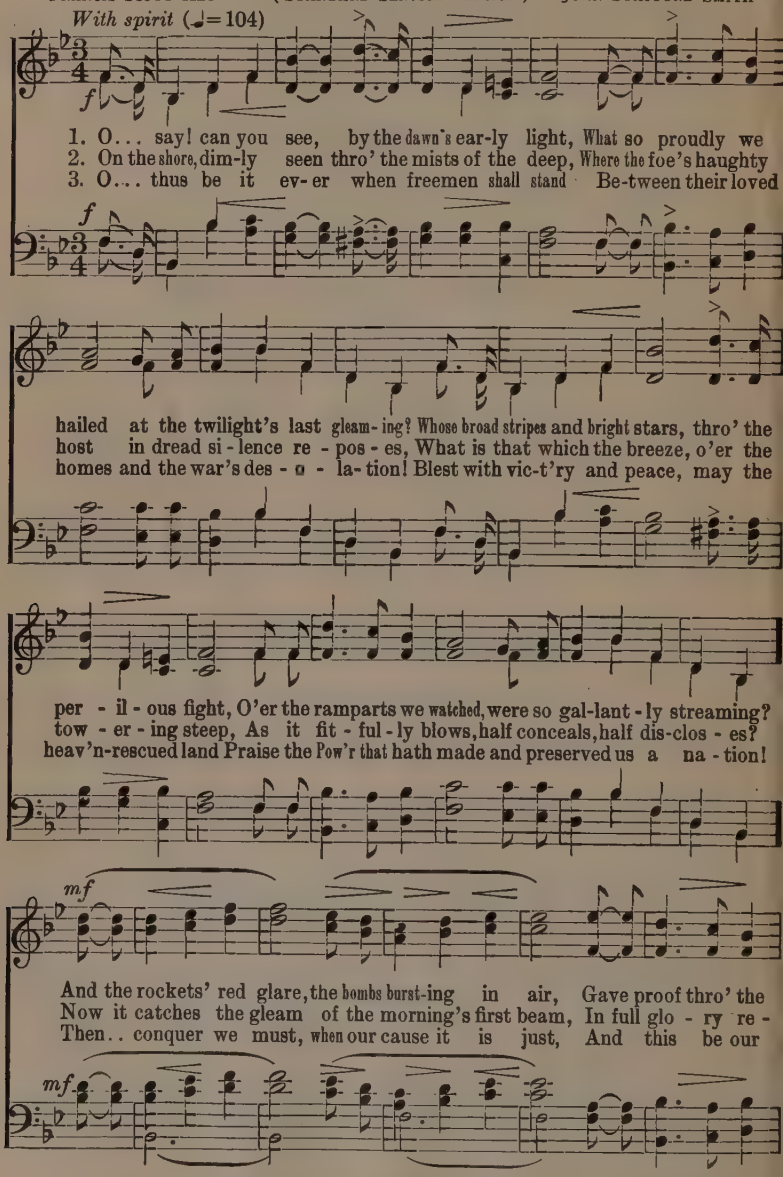
MY COUNTRY! 'TIS OF THEE

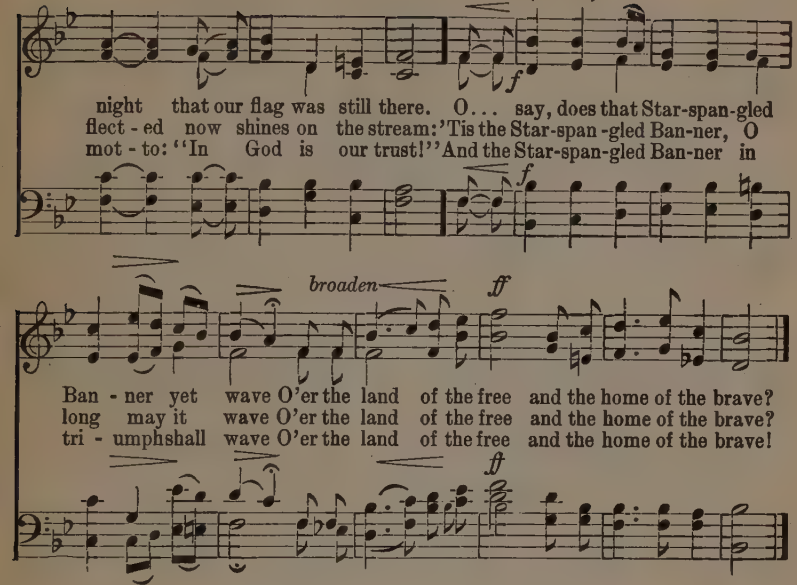
S. F. Smith (AMERICA) Henry Carey


1. My coun - try! 'tis of thee, Sweet land of lib - er - ty,
2. My na - tive coun - try, thee, Land of the no - ble free,
3. Let mu - sic swell the breeze, And ring from all the trees
4. Our fa - thers' God, to Thee, Au - thor of lib - er - ty,
Of thee I sing; Land where my fa - thers died, Land of the
Thy name I love; I love thy rocks and rills, Thy woods and
Sweet freedom's song; Let mor - tal tongues a - wake, Let all that
To Thee we sing, Long may our land be bright With free-dom's
Pil - grims' pride, From ev - 'ry moun - tain side Let free - dom ring!
tem - pled hills; My heart with rap - ture thrills Like that a - bove.
breathe par-take, Let rocks their si - lence break, The sound pro - long.
ho - ly light, Pro - tect us by Thy might, Great God, our King.

THE STAR-SPANGLED BANNER

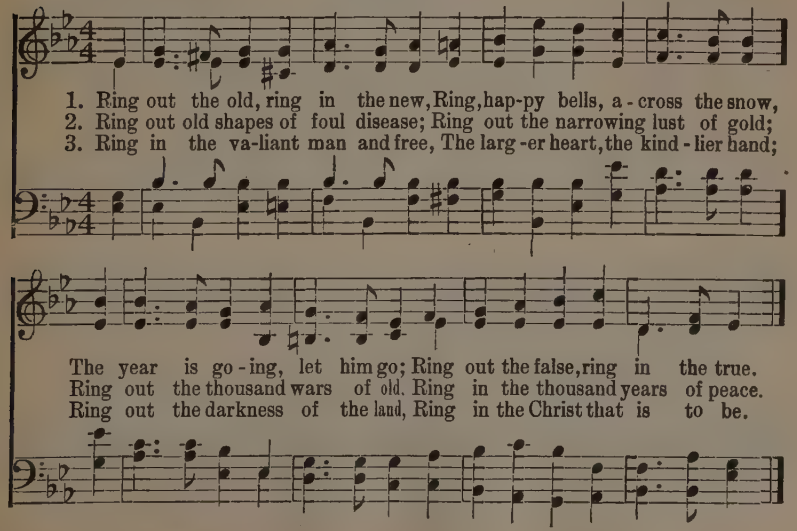
FRANCIS SCOTT KEY (STANDARD SERVICE VERSION) JOHN STAFFORD SMITH


With spirit (♩=104)
f
1. O... say! can you see, by the dawn's ear-ly light, What so proudly we
2. On the shore, dim-ly seen thro' the mists of the deep, Where the foe's haughty
3. O.... thus be it ev-er when freemen shall stand Be-tween their loved
hailed at the twilight's last gleam-ing? Whose broad stripes and bright stars, thro' the
host in dread si-lence re-pos-es, What is that which the breeze, o'er the
homes and the war's des-o-la-tion! Blest with vic-t'ry and peace, may the
per-il-ous fight, O'er the ramparts we watched, were so gal-lant-ly streaming?
tow-er-ing steep, As it fit-ful-ly blows, half conceals, half dis-clos-es?
heav'n-rescued land Praise the Pow'r that hath made and preserved us a na-tion!
mf
And the rockets' red glare, the bombs burst-ing in air, Gave proof thro' the
Now it catches the gleam of the morning's first beam, In full glo-ry re-
Then.. conquer we must, when our cause it is just, And this be our

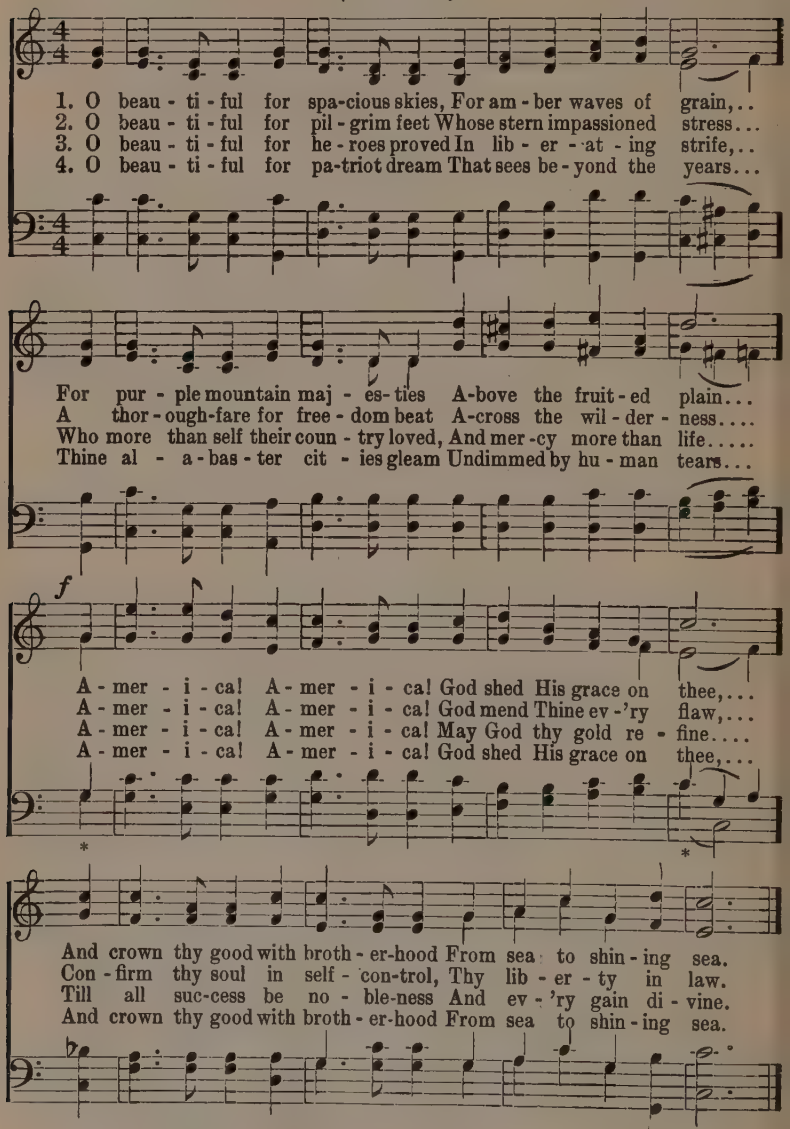

night that our flag was still there. O... say, does that Star-span-gled
flect-ed now shines on the stream: 'Tis the Star-span-gled Ban-ner, O
mot-to: "In God is our trust!" And the Star-span-gled Ban-ner in
broaden
Ban-ner yet wave O'er the land of the free and the home of the brave?
long may it wave O'er the land of the free and the home of the brave?
tri-umphshall wave O'er the land of the free and the home of the brave!

TO THE NEW YEAR

ALFRED TENNYSON (WALTHAM) J. BAPTISTE CALKIN


1. Ring out the old, ring in the new, Ring, hap-py bells, a-cross the snow,
2. Ring out old shapes of foul disease; Ring out the narrowing lust of gold;
3. Ring in the va-liant man and free, The larg-er heart, the kind-lier hand;
The year is go-ing, let him go; Ring out the false, ring in the true.
Ring out the thousand wars of old. Ring in the thousand years of peace.
Ring out the darkness of the land, Ring in the Christ that is to be.

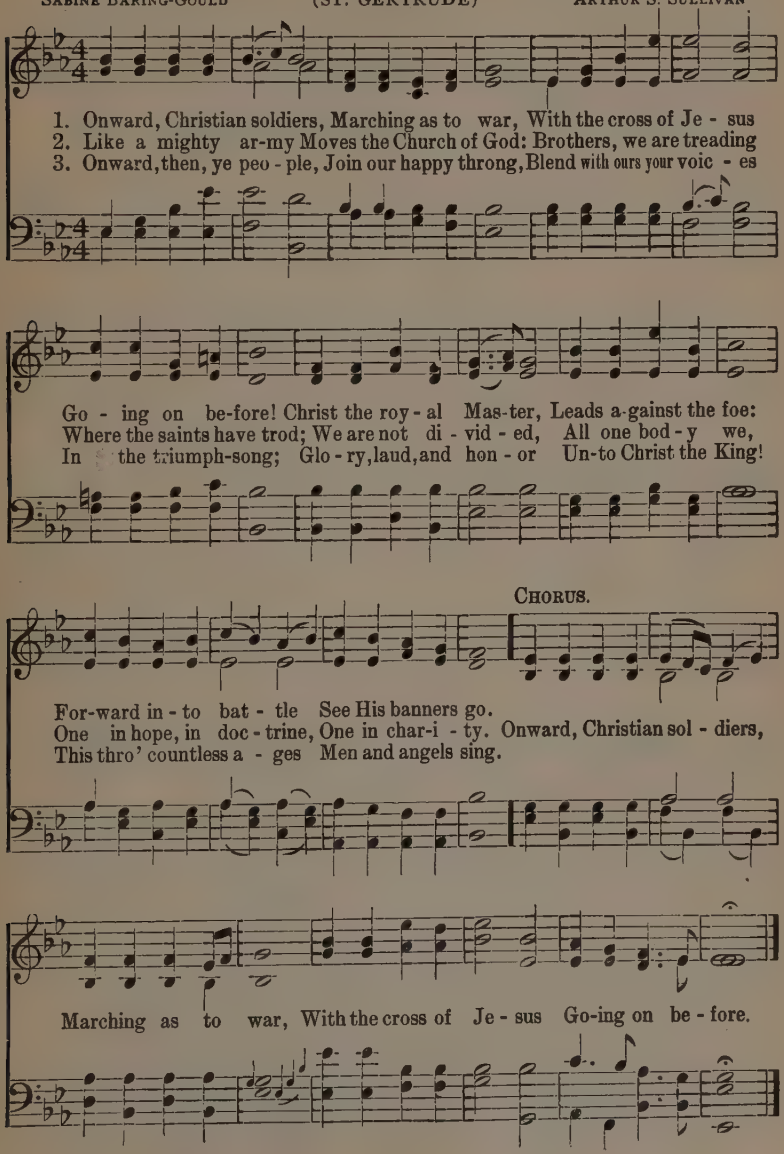
AMERICA, THE BEAUTIFUL

KATHARINE LEE BATES (MATERNA) SAMUEL A. WARD

1. O beau - ti - ful for spa-cious skies, For am - ber waves of grain,...
2. O beau - ti - ful for pil - grim feet Whose stern impassioned stress...
3. O beau - ti - ful for he - roes proved In lib - er - at - ing strife,...
4. O beau - ti - ful for pa-triot dream That sees be - yond the years...
For pur - ple mountain maj - es- ties A-bove the fruit - ed plain...
A thor - ough-fare for free - dom beat A-cross the wil - der - ness....
Who more than self their coun - try loved, And mer - cy more than life.....
Thine al - a - bas - ter cit - ies gleam Undimmed by hu - man tears...
f
A - mer - i - ca! A - mer - i - ca! God shed His grace on thee,...
A - mer - i - ca! A - mer - i - ca! God mend Thine ev - 'ry flaw,...
A - mer - i - ca! A - mer - i - ca! May God thy gold re - fine....
A - mer - i - ca! A - mer - i - ca! God shed His grace on thee,...
*
*
And crown thy good with broth - er-hood From sea to shin - ing sea.
Con - firm thy soul in self - con-trol, Thy lib - er - ty in law.
Till all suc-cess be no - ble-ness And ev - 'ry gain di - vine.
And crown thy good with broth - er-hood From sea to shin - ing sea.

The Bass strongly marked from * to *.

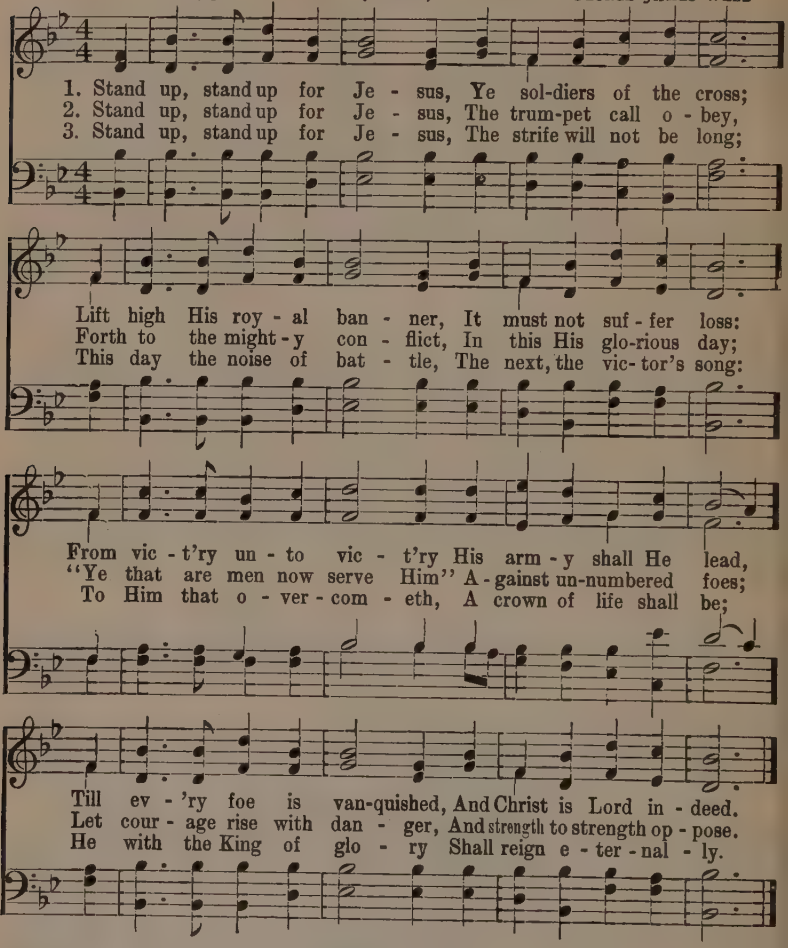
ONWARD, CHRISTIAN SOLDIERS

SABINE BARING-GOULD (ST. GERTRUDE) ARTHUR S. SULLIVAN


1. Onward, Christian soldiers, Marching as to war, With the cross of Je - sus
2. Like a mighty ar-my Moves the Church of God: Brothers, we are treading
3. Onward, then, ye peo - ple, Join our happy throng, Blend with ours your voic - es
Go - ing on be-fore! Christ the roy - al Mas-ter, Leads a-gainst the foe:
Where the saints have trod; We are not di - vid - ed, All one bod - y we,
In the triumph-song; Glo - ry, laud, and hon - or Un-to Christ the King!
CHORUS.
For-ward in - to bat - tle See His banners go.
One in hope, in doc - trine, One in char-i - ty. Onward, Christian sol - diers,
This thro' countless a - ges Men and angels sing.
Marching as to war, With the cross of Je - sus Go-ing on be - fore.

STAND UP, STAND UP FOR JESUS

GEORGE DUFFIELD, JR. (WEBB) GEORGE JAMES WEBB


1. Stand up, stand up for Je - sus, Ye sol-diers of the cross;
2. Stand up, stand up for Je - sus, The trum-pet call o - bey,
3. Stand up, stand up for Je - sus, The strife will not be long;
Lift high His roy - al ban - ner, It must not suf - fer loss:
Forth to the might - y con - flict, In this His glo-rious day;
This day the noise of bat - tle, The next, the vic- tor's song:
From vic - t'ry un - to vic - t'ry His arm - y shall He lead,
"Ye that are men now serve Him" A - gainst un-numbered foes;
To Him that o - ver - com - eth, A crown of life shall be;
Till ev - 'ry foe is van-quished, And Christ is Lord in - deed.
Let cour - age rise with dan - ger, And strength to strength op - pose.
He with the King of glo - ry Shall reign e - ter - nal - ly.

MARCH ON!

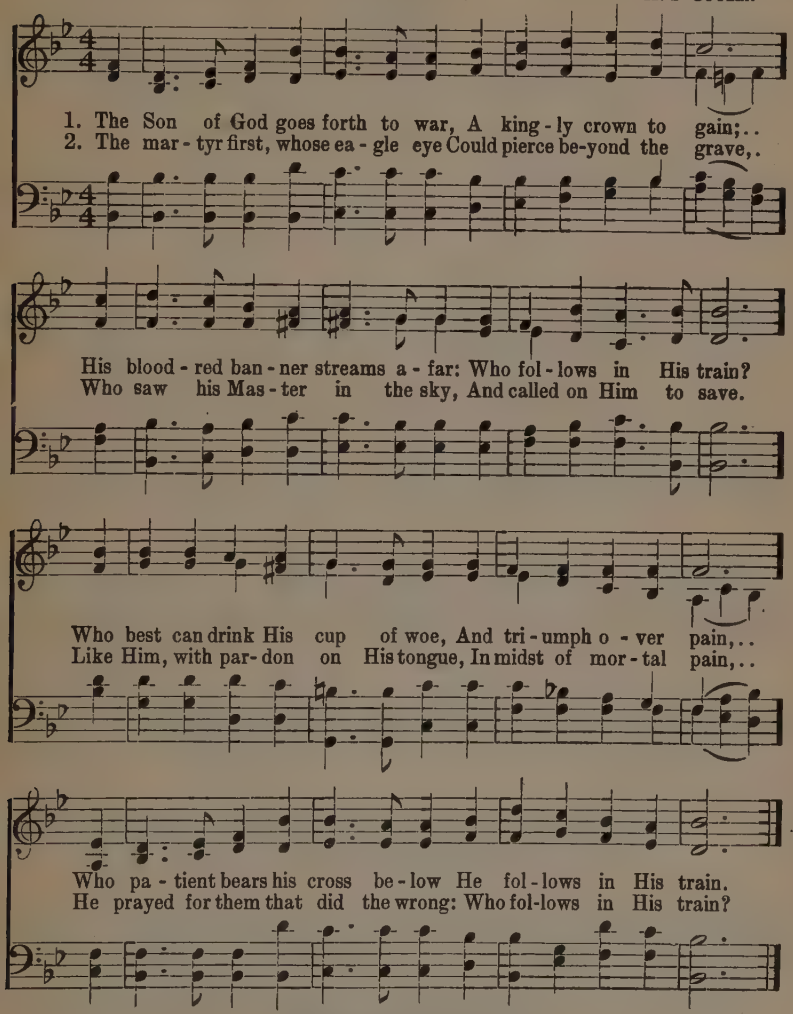
1 March on, march on, good comrades,
Along the chosen road,
With strength that breasts all hardships.
And carries any load;
With footsteps sure and steady,
With eyes serene and clear,
An arm forever ready
To help the neighbor near.

2 March on, march on, good comrades,
And, keeping to the course,
Call pluck and pride to aid us,
Call grit, and vim, and force;
With shoulders squared for danger,
Straight onward, onward go,
To every vice a stranger,
To every wrong a foe.

—EDITH TILLOTSON

THE SON OF GOD GOES FORTH TO WAR 567

R. Heber (ALL SAINTS) H. S. Cutler


1. The Son of God goes forth to war, A king-ly crown to gain;..
2. The mar-tyr first, whose ea-gle eye Could pierce be-yond the grave,.
His blood-red ban-ner streams a-far: Who fol-lows in His train?
Who saw his Mas-ter in the sky, And called on Him to save.
Who best can drink His cup of woe, And tri-umph o-ver pain,..
Like Him, with par-don on His tongue, In midst of mor-tal pain,..
Who pa-tient bears his cross be-low He fol-lows in His train.
He prayed for them that did the wrong: Who fol-lows in His train?

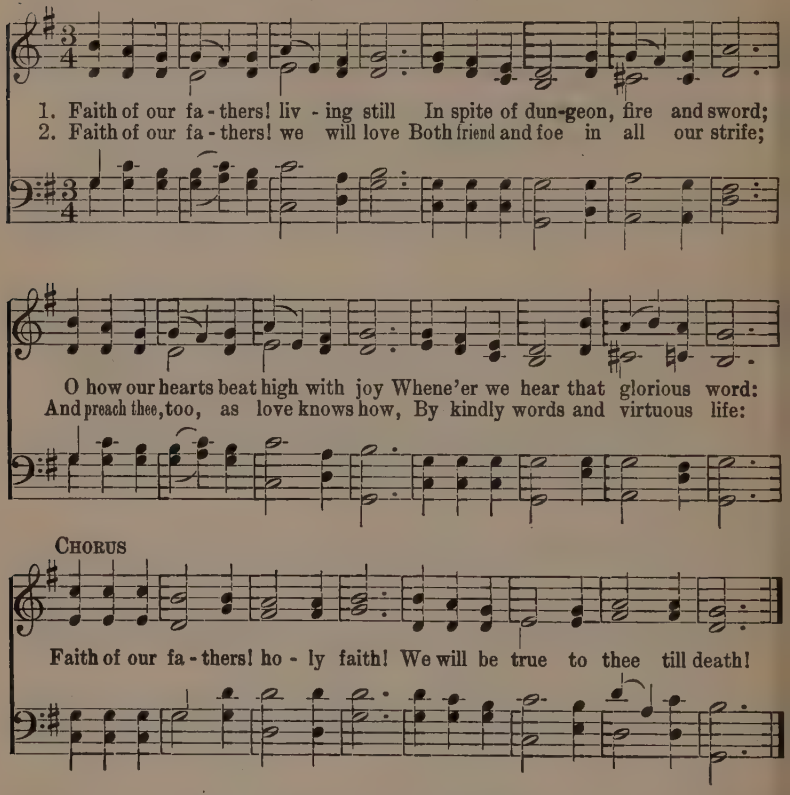
LET THESE BE MINE

An eye as keen and clear as light, the strength of oak and pine,
A mind like clean, pure water bright—let these, all these be mine;
For he who measures to this test, shall dwell in true accord
With that which ever seeks the best—with nature and her Lord.

—Edith Tillotson

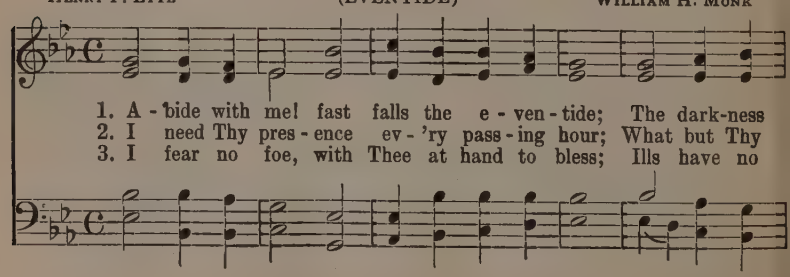
FAITH OF OUR FATHERS

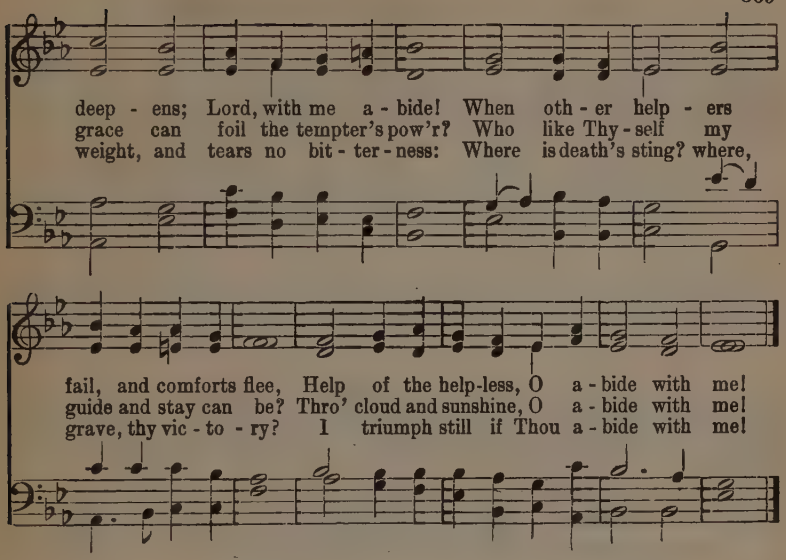
FREDERICK W. FABER (ST. CATHERINE) HENRY F. HEMY


1. Faith of our fa - thers! liv - ing still In spite of dun-geon, fire and sword;
2. Faith of our fa - thers! we will love Both friend and foe in all our strife;
O how our hearts beat high with joy Whene'er we hear that glorious word:
And preach thee, too, as love knows how, By kindly words and virtuous life:
CHORUS
Faith of our fa - thers! ho - ly faith! We will be true to thee till death!

ABIDE WITH ME

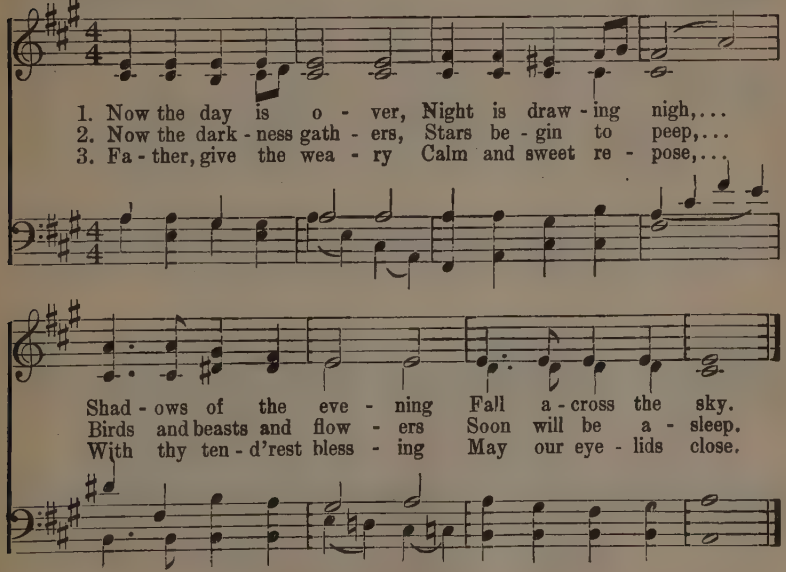
HENRY F. LYTE (EVENTIDE) WILLIAM H. MONK


1. A - bide with me! fast falls the e - ven - tide; The dark-ness
2. I need Thy pres - ence ev - 'ry pass - ing hour; What but Thy
3. I fear no foe, with Thee at hand to bless; Ills have no


deep - ens; Lord, with me a - bide! When oth - er help - ers
grace can foil the tempter's pow'r? Who like Thy - self my
weight, and tears no bit - ter - ness: Where is death's sting? where,
fail, and comforts flee, Help of the help-less, O a - bide with me!
guide and stay can be? Thro' cloud and sunshine, O a - bide with me!
grave, thy vic - to - ry? I triumph still if Thou a - bide with me!

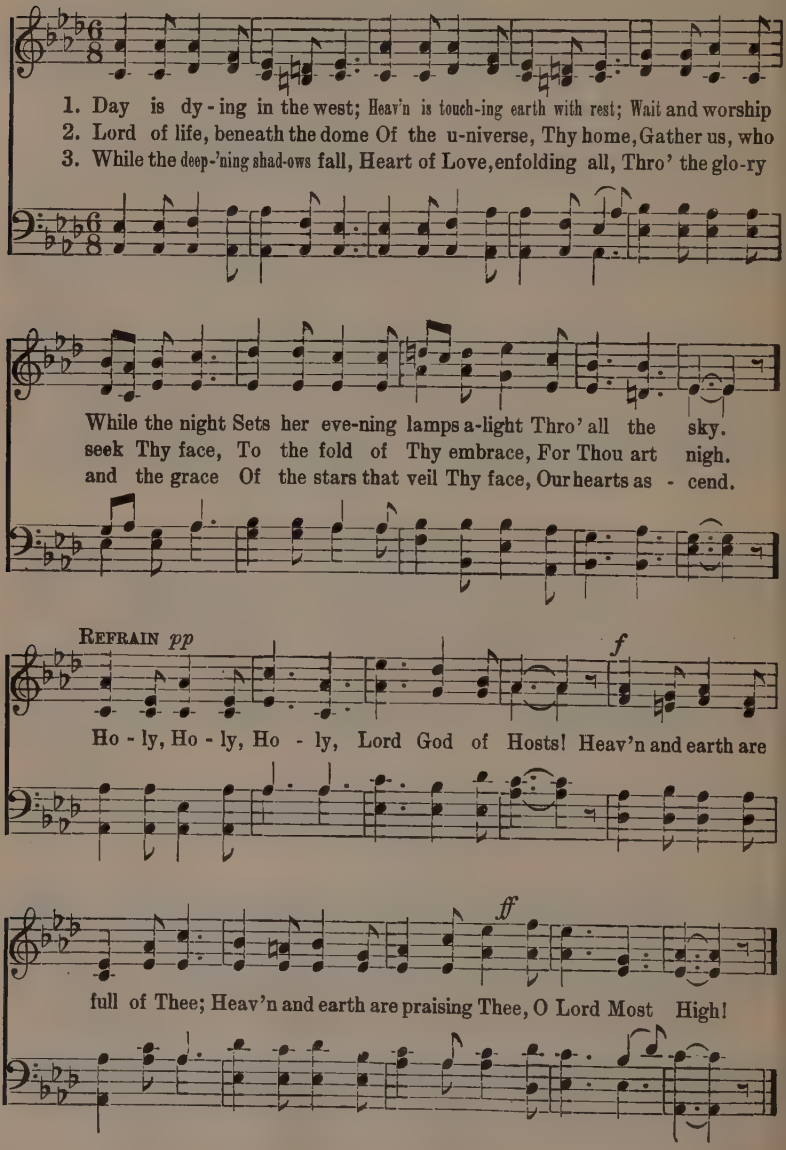
NOW THE DAY IS OVER

S. Baring-Gould J. Barnby


1. Now the day is o - ver, Night is draw - ing nigh,...
2. Now the dark - ness gath - ers, Stars be - gin to peep,...
3. Fa - ther, give the wea - ry Calm and sweet re - pose,...
Shad - ows of the eve - ning Fall a - cross the sky.
Birds and beasts and flow - ers Soon will be a - sleep.
With thy ten - d'rest bless - ing May our eye - lids close.

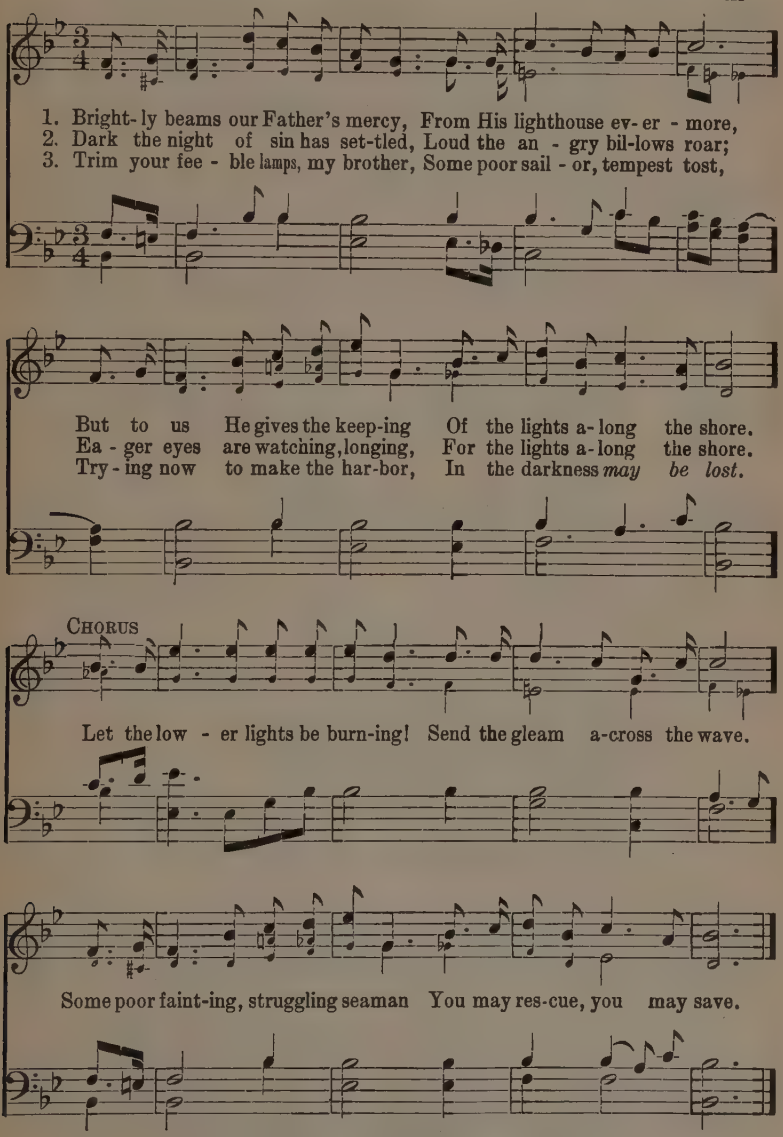
DAY IS DYING IN THE WEST

MARY ANN LATHBURY (CHAUTAUQUA) W. F. SHERWIN


1. Day is dy - ing in the west; Heav'n is touch-ing earth with rest; Wait and worship
2. Lord of life, beneath the dome Of the u-niverse, Thy home, Gather us, who
3. While the deep-'ning shad-ows fall, Heart of Love, enfolding all, Thro' the glo-ry
While the night Sets her eve-ning lamps a-light Thro' all the sky.
seek Thy face, To the fold of Thy embrace, For Thou art nigh.
and the grace Of the stars that veil Thy face, Our hearts as - cend.
REFRAIN pp
f
Ho - ly, Ho - ly, Ho - ly, Lord God of Hosts! Heav'n and earth are
ff
full of Thee; Heav'n and earth are praising Thee, O Lord Most High!

LET THE LOWER LIGHTS BE BURNING 571

P. P. Bliss


1. Bright- ly beams our Father's mercy, From His lighthouse ev- er - more,
2. Dark the night of sin has set-tled, Loud the an - gry bil-lows roar;
3. Trim your fee - ble lamps, my brother, Some poor sail - or, tempest tost,
But to us He gives the keep-ing Of the lights a- long the shore.
Ea - ger eyes are watching, longing, For the lights a- long the shore.
Try - ing now to make the har-bor, In the darkness *may be lost.*
Chorus
Let the low - er lights be burn-ing! Send the gleam a-cross the wave.
Some poor faint-ing, struggling seaman You may res-cue, you may save.

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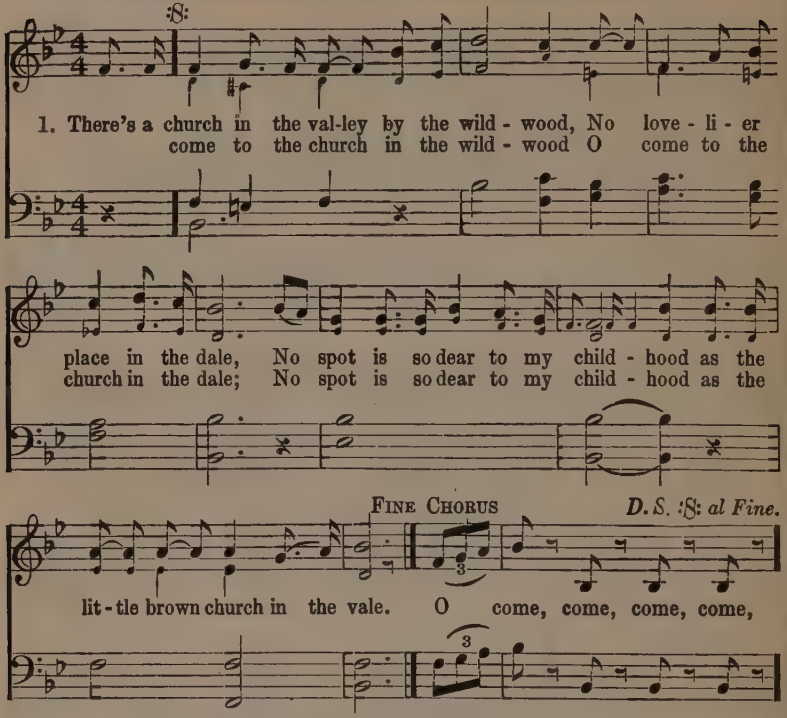
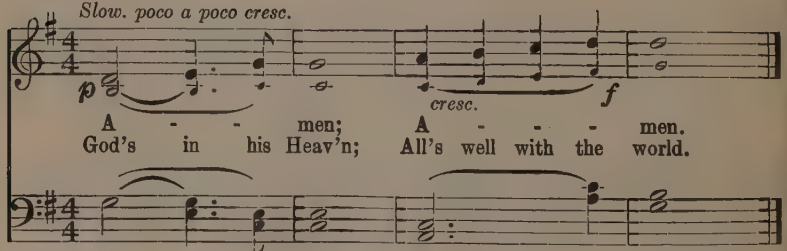
THE CHURCH IN THE WILDWOOD


:S:
1. There's a church in the val-ley by the wild - wood, No love - li - er
come to the church in the wild - wood O come to the
place in the dale, No spot is so dear to my child - hood as the
church in the dale; No spot is so dear to my child - hood as the
FINE CHORUS
D. S. :S: al Fine.
lit - tle brown church in the vale. O come, come, come, come,
3
3

2 Come to the church in the wildwood,
To the tree where the wildflowers bloom;
Where the parting hymn shall be chanted,
We will rest by the side of the tomb.
CHO. Then come;———come to the church in the wildwood,
For there's where my love used to be;
She could dance, she could sing, she could turn a hand-spring,
She could climb up a sycamore tree.

DRESDEN AMEN

ROBERT BROWNING — Traditional



THE LONG, LONG TRAIL.

[Key of A-flat]

There's a long, long trail a-winding
Into the land of my dreams,
Where the nightingales are singing
And a white moon beams.
There's a long, long night of waiting
Until my dreams all come true;
Till the day when I'll be going down
That long, long trail with you.

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A PERFECT DAY

[Key of A-flat]

When you come to the end of a perfect day
And you sit alone with your thought;
While the chimes ring out with a carol gay
For the joy that the day has brought.
Do you think what the end of a perfect day
Can mean to a tired heart,
When the sun goes down with a flaming ray
And the dear friends have to part?

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SWEET ADELINE.

[Key of B-flat]

Sweet Adeline, my Adeline,
At night, dear heart, for you I pine.
In all my dreams your fair face beams,
You're the flower of my heart, sweet Adeline.

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CARRY ME BACK TO OLD VIRGINNY.

[Key of A-flat]

Carry me back to old Virginny,
There's where the cotton and the corn and 'tatoes grow;
There's where the birds warble sweet in the springtime,
There's where the old darkey's heart has long'd to go.
There's where I labored so hard for old Massa
Day after day in the fields of yellow corn.
No place on earth do I love more sincerely
Than old Virginny, the State where I was born.
Chorus—(Repeat first four lines).

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SMILES.

[Key of A-flat]

There are smiles that make us happy,
There are smiles that make us blue,
There are smiles that steal away the tear drops
As the sunbeams kiss away the dew.
There are smiles that have a tender meaning
That the eyes of love alone can see,
But the smiles that fill my life with sunshine
Are the smiles that you give to me.

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KEEP THE HOME FIRES BURNING.

[Key of A-flat]

Keep the home fires burning
While your hearts are yearning.
Though our lads are far away,
They dream of home;
There's a silver lining
Through the dark cloud shining.
Turn the dark cloud inside out
Till the Boys come home.

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BUBBLES

[Key of B-flat]

I'm forever blowing bubbles—
Pretty bubbles in the air.
They fly so high, nearly reach the sky,
Then like my dreams they fade and die.
Fortune's always hiding—I've looked everywhere.
I'm forever blowing bubbles—pretty bubbles in the air.

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LONG, LONG AGO

[Key of F]

Tell me the tales that to me were so dear,
Long, long ago, long, long ago;
Sing me the songs I delighted to hear,
Long, long ago, long ago;
Now you are come, all my grief is removed,
Let me forget that so long you have roved,
Let me believe that you love as you loved,
Long, long ago, long ago.

K-K-K-KATY.

[Key of A-flat]

K-K-K-Katy, beautiful Katy,
You're the only g-g-g-girl that I adore;
When the m-m-m-moon shines, over the cow shed,
I'll be waiting at the k-k-k-kitchen door.

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MASSA'S IN THE COLD, COLD GROUND

[Key of D]

'Round the meadow am a-ringing
The darkies' mournful song,
While the mocking-bird am singing,
Happy as the day is long.
Where the ivy am a-creeping
O'er the grassy mound,
There old Massa am a-sleeping,
Sleeping in the cold, cold ground.

Chorus

Down in the cornfield,
Hear that mournful sound,
All the darkies am a-weeping,
Massa's in the cold, cold ground.

When the autumn leaves were falling,
When the days were cold,
'Twas hard to hear old Massa calling,
'Cause he was so weak and old.
Now the orange am a-blooming
On the sandy shore,
Now the summer days am coming,
Massa never calls no more.

HARK! I HEAR A VOICE

[Key of A-flat]

Hark! I hear a voice,
'Way up on the mountain top, tip-top,
Descending down below, descending down below.
Hark! I hear a voice,
'Way up on the mountain top, tip-top,
Descending down below, descending down below.
Let us all unite in love,
Trusting in the pow'rs above,
Let us all unite in love,
Trusting in the pow'rs above,
Merrily now we roll, we roll, we roll, we roll, we roll, we roll,
Merrily now we roll, we roll
O'er the deep blue sea.

COMRADES

[Key of C]

Comrades, comrades, ever since we were boys,
Sharing each other's sorrows, sharing each other's joys;
Comrades when manhood was dawning, faithful whate'er might betide,
When danger threatened, my darling old comrade was there by my side.

COMIN' THRO' THE RYE

[Key of G]

1. If a body meet a body
Comin thro' the rye,
If a body kiss a body,
Need a body cry?

Chorus

Ev'ry lassie has her laddie;
Nane, they say, ha'e I;
Yet a' the lads they smile on me
When comin' thro' the rye.

2. If a body meet a body
Comin' frae the town,
If a body greet a body,
Need a body frown?

ROCKED IN THE CRADLE OF THE DEEP

[Key of F]

Rock'd in the cradle of the deep,
I lay me down in peace to sleep;
Secure I rest upon the wave,
For Thou, O Lord, hast pow'r to save.
I know Thou wilt not slight my call,
For Thou dost mark the sparrow's fall;
And calm and peaceful is my sleep,
Rock'd in the cradle of the deep.

And such the trust that still were mine,
Tho' stormy winds swept o'er the brine;
Or though the tempest's fiery breath
Rous'd me from sleep to wreck and death;
In ocean cave still safe with Thee,
The germ of immortality;
And calm and peaceful is my sleep,
Rock'd in the cradle of the deep.

DRINK TO ME ONLY WITH THINE EYES

[Key of E-flat]

1. Drink to me only with thine eyes,
And I will pledge with mine,
Or leave a kiss within the cup
And I'll not ask for wine;
The thirst that from the soul doth rise
Doth ask a drink divine;
But might I of Jove's nectar sip
I would not change for thine.

2. I sent thee late a rosy wreath,
Not so much hon'ring thee
As giving it a hope that there
It could not withered be.
But thou thereon did'st only breathe
And send'st it back to me;
Since when it grows and smells, I swear,
Not of itself, but thee.

JOHN BROWN'S BABY

*("Achoo—a Choo!")

John Brown's *baby* had a *cold* upon its *chest,*
John Brown's *baby* had a *cold* upon its *chest,*
John Brown's *baby* had a *cold* upon its *chest,*
And we rubbed it with camphorated oil.

* Action song: (a) rocking motion with arms, instead of "baby"; (b) sneeze, instead of "cold"; (c) strike chest, instead of "chest." First time, sing all; second, *a;* third, *a* and *b;* fourth, *a, b,* and *c.*

THE OLD OAKEN BUCKET

[Key of G]

How dear to this heart are the scenes of my childhood,
When fond recollection presents them to view,
The orchard, the meadow, the deep tangled wildwood,
And ev'ry lov'd spot which my infancy knew.
The wide spreading stream, the mill that stood by it,
The bridge and the rock where the cataract fell;
The cot of my father, the dairy house nigh it,
And e'en the rude bucket that hung in the well.

Ch. The old oaken bucket, the iron-bound bucket,
The moss-cover'd bucket that hung in the well.

THOSE ENDEARING YOUNG CHARMS

[Key of E-flat]

1. Believe me, if all those endearing young charms
Which I gaze on so fondly to-day,
Were to change by to-morrow and fleet in my arms
Like fairy gifts fading away,
Thou wouldst still be ador'd as this moment thou art,
Let thy loveliness fade as it will,
And around the dear ruin each wish of my heart
Would twine itself verdantly still.

2. It is not while beauty and youth are thine own,
And thy cheeks unprofan'd by a tear,
That the fervor and faith of a soul can be known,
To which time will but make thee more dear.
No, the heart that has truly lov'd never forgets,
But as truly loves on to the close;
As the sunflower turns on her god when he sets
The same look which she turn'd when he rose.

TAVERN IN THE TOWN

[Key of C]

There is a tavern in the town, in the town,
And there my true love sits him down, sits him down,
And takes his ease 'mid laughter free
And never, never thinks of me, thinks of me.
Fare thee well, for I must leave thee,
Do not let the parting grieve thee,
And remember that the best of friends must part.
Adieu, adieu, kind friends, adieu, adieu, adieu,
I can no longer stay with you, stay with you,
I'll hang my harp on a weeping willow tree,
And may the world go well with thee.

THE SIDEWALKS OF NEW YORK

Chorus

East side, west side, all around the town,
The tots sang "Ring-a-rosie," "London Bridge is falling down,"
Boys and girls together, me and Mamie Rorke
Tripped the light fantastic on the sidewalks of New York.

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TENTING ON THE OLD CAMP-GROUND

[Key of B-flat]

1. We're tenting to-night on the old camp-ground,
Give us a song to cheer
Our weary hearts, a song of home
And friends we love so dear.

Cho. Many are the hearts that are weary to-night,
Wishing for the war to cease,
Many are the hearts that are looking for the right,
To see the dawn of peace.
Tenting to-night,
Tenting to-night,
Tenting on the old camp-ground.

2. We've been tenting to-night on the old camp-ground,
Thinking of days gone by,
Of the lov'd ones at home that gave us the hand,
And the tear that said "Good-bye!"

THE MARSEILLAISE

[Key of E]

Ye sons of France, awake to glory!
Hark! hark! what myriads bid you rise!
Your children, wives and grandsires hoary,
Behold their tears and hear their cries!
Shall hateful tyrants, mischief breeding,
With hireling host, a ruffian band,
Affright and desolate the land,
While Peace and Liberty lie bleeding?

To arms! To arms, ye brave!
Th' avenging sword unsheathe;
March on! March on!
All hearts resolved on victory or death!

SAILING

[Key of B-flat]

Y'heave ho! my lads, the wind blows free,
A pleasant gale is on our lee;
And soon across the ocean clear
Our gallant bark shall bravely steer;
But e'er we part from England's shores to-night,
A song we'll sing for home and beauty bright.
Then here's to the sailor, and here's to the heart so true,
Who will think of him upon the waters blue!
Cho. Sailing, sailing, over the bounding main,
For many a stormy wind shall blow ere Jack comes home again.
Sailing, sailing, over the bounding main,
For many a stormy wind shall blow ere Jack comes home again.

IN THE GOOD OLD CAMPING TIME

Tune: In the Good old Summer Time.
[Key of B-flat]

There's a time in each year,
That we boys all hold dear,
Good old Camping time;
When starched shirt and collar
At last makes us holler
For the good old Camping time!
With baseball and bruises,
And sunburn and cruises,
Till Ma wouldn't know her own boy!
Some skeeters annoying,
We can't help enjoying,
The good old Camping time!

Ch. In the good old Camping time,
Oh, the good old Camping time,
Living 'mid the woods and streams,
What a joy divine.

Give a cheer for....., boys!
Let its fame reach every clime,
For that's the place we're happy
In the good old Camping time.

—C. C. Robinson.

OH! BEAUTIFUL

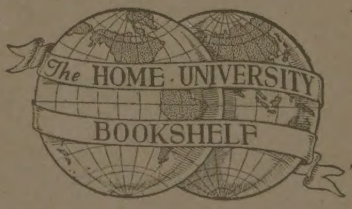
Tune: Sweet Rosie O'Grady [Key of G]

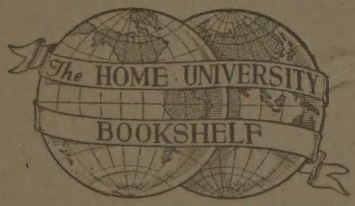
Oh, beautiful sausage, plump, shiny and round,
Right out of the broiler, hot, crusty, and browned,
Just hand 'em right over, I'm waiting, you see,
I want that beautiful sausage,
That beautiful sausage wants me.

Oh, beautiful raindrops, stay, stay in the sky,
Go, chase yourself backwards, I want to keep dry,
I've other arrangements, no uses for you,
I love the beautiful raindrops—
I love 'em like measles, I do.

Oh, beautiful skeeters, sing, sing me to sleep,
You've made an impression, sharp, pointed, and deep,
And if you were muzzled, how happy I'd be—
I love the beautiful skeeters,
The beautiful skeeters love me.

—Edith Tillotson


The HOME · UNIVERSITY
BOOKSHELF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